ELECTRICAL REVIEW

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Better House Wiring

Immediate Post-War Needs and Future Probabilities

THE dual purpose of the inspiring paper on the future of domestic wiring installations, which attracted a large attendance, started discussion that will not end within the I.E.E. lecture theatre. Not so much on account of the refreshing novelty of many of the four authors' ideas, controversial in parts though some of them may be, but because the subject must have earnest attention now if an unparalleled opportunity is not to be missed of worthily contributing to better housing amenities, the demand for which will press urgently immediately the war ends, or even before.

So the electrical industry must not delay forming a clear picture of what it will try to do. The futility of attempting to compel everyone to utilise electricity for all purposes is evident, and avoidable opposition can be exasperatingly obstructive when so many small houses tend naturally towards the all-electric ideal if they are not denied the opportunity.

I.E.E. Rules and Cost

In general, and to a somewhat surprisingly large degree, the authors' proposals appear to be acceptable in principle. But, on the one hand, to follow the I.E.E. Wiring Rules strictly in the case of the type of house and size of load anticipated will be unnecessarily cumbersome and costly. On the other hand, the " cheapest possible " policy must be got rid of, for one should not have to make excuses for putting in really good installations. Electricity's greatest contribution to labour-saving and comfort is undoubtedly made by the smaller appliances, which fact has been clouded by over-emphasis, in this country, of "current-consuming " apparatus.

One of the most logical forms of encouragement will be really liberal provision of universal plug-socket outlets in every room, energised on the ring-main principle and unobtrusively accommodated within wall skirtings specially contrived for the purpose. This method is adaptable and it can be economic too ; it was advocated editorially nearly five years ago (*Electrical Review*, November 18th, 1938, p. 709 and February 10th, 1939, p. 185), for it is strangely true that a room fitted with three plug-sockets is only very slightly more effective than a single-outlet apartment.

Not Impossible or Expensive

To satisfy all contingencies of convenience will necessitate tapping every 3 ft. round the complete perimeter, which may seem impracticable by comparison with present ideas. But the authors do show that it is not beyond the skill of designers, or very expensive either, to devise means whereby sockets may be introduced wherever and whenever they may be required.

While long-range planning is difficult and short-term planning may be easy, or *vice versa*, depending upon whether the planner is a visionary or merely a practical man, there is no very good reason to assume the impossibility of a practical visionary. Thus the more distant view taken in the latter half of the paper of new materials and fresh methods, structural as well as electrical, which may be adopted after

immediate post-war needs have been satisfied according to the first half of the paper, is indicative of delightful freshness of mind. It is an endeavour to prevent the weakness of insufficiency at the roots and avoid the entanglement of rank growth in the branches. But it will demand collaboration of a wideness and closeness that has not hitherto been achieved. Will this prove to be the hardest part of the task?

Engineers for the Forces

IT is nearly three years ago since qualified electrical engineers were required to give particulars of their training and experience. This was principally to secure men for responsible posts in industry. Later, special schemes for training young engineers for the Forces were announced. Now the demands of the Forces have become paramount and electrical and mechanical engineers are again being called upon to register. This time the net is spread wider to take in not only graduates of the Institutions but also men who have served regular apprenticeships or have other qualifications. The Ministry of Labour says that the needs of the Services are to be the first consideration even if production suffers. It is not intended, of course, to drain industry of technical men and possibly only a small proportion of those registering will be taken from their present jobs.

Supervisors

As industry becomes increasingly dependent upon electricity, so it has more and more to rely upon the ungrudging service given, in and out of ordinary hours, by the men responsible for the installation and maintenance of electrical plant and apparatus. This responsibility has enormously increased with wartime extensions, longer running hours, heavier loading of plant (with scanty time for repairs) and dilution of labour. The eminent speakers at the annual luncheon of the Association of Supervising Electrical Engineers were unstinting in their tributes to the value of its members' contribution to the common cause, and it was pleasing to learn that the Association has been instrumental in obtaining for them some material recognition as well. A proper appreciation of the status that is their due is essential under war conditions and will be no less so when post-war reconstruction is put in hand.

Technical Debates?

IN these austere times the annual informal luncheon of the I.E.E. Transmission Section provides a rare opportunity for electrical engineers to meet, with the personal factor to the fore. The one last week, under Mr. P. E. Rycroft's chairmanship, worthily maintained the tradition. The suggestion by the I.E.E. President, Professor C. L. Fortescue, that Section meetings might be made the occasion for organised debates with subsequent voting holds out possibilities of exciting evenings. Although all the subjects discussed might not be suitable for this treatment, many members would no doubt be interested to see experiments carried out on these lines.

Dry Substations

THE precautionary measures taken of late years towards mitigating the effects of internal or external explosions and fires at substations have added to the possibility of moisture condensation due to stagnant air. Application of artificial heat for increasing the moisture-absorption capacity of air locally, besides often being costly, needs to be supplemented by means to circulate the air, since, at remote points of the building, temperatures may well fall below dew point. The experience of Messrs. Favell and E. W. Connon, described in their I.E.E. Transmission Section paper, is a practical contribution to the available knowledge of the subject.

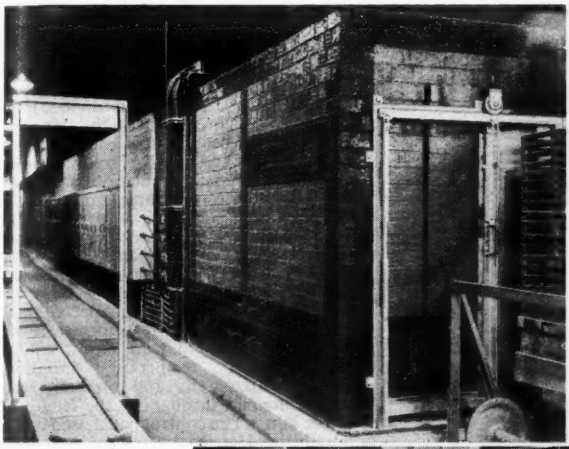
Control of Heating

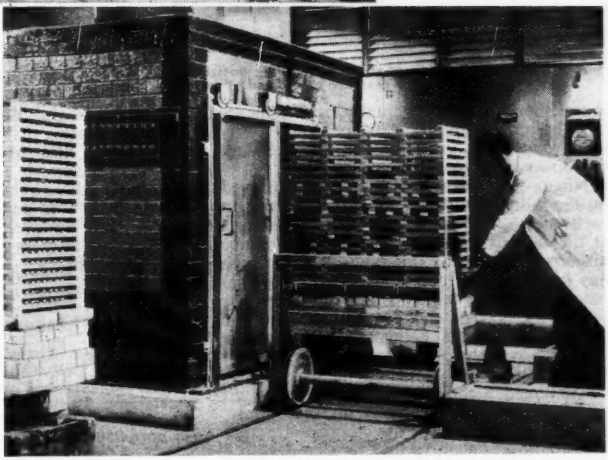
PARTICULARS have reached us of remarkable results that have followed the application of "degree-days" control to electric space heating. In one large installation a consumption of approximately one million kWh in 1936-37 was reduced by one-third during the more severe season of 1941-42. In another instance, a workshop, the amount taken (150,000 kWh) in 1939-40 was less by two-thirds, although it is stated that the temperature during the daily period of occupation (9½ hr.) never fell below 56 deg. F. These figures would appear to support the view of Mr. R. Grierson (who writes in this issue), in favour of the automatic control of space-heating machines strictly in accordance with real requirements in the continuous warming of buildings.

Firing Pottery

High-Temperature Continuous Electric Kiln Used for Producing China Gloss

WHAT is believed to be the first British-made continuous electric tunnel kiln operating at temperatures up to 1,140 deg. C. is now in operation at the works of the Worcester Royal Porcelain Co., Ltd. The new kiln, a development of decorating kilns which operate at a maximum temperature of 900 deg. C., is suitable, due to the higher temperature available, for handling pottery up to the fine china gloss range, and it is probable that it may be developed still further to render it suitable for producing "biscuit."





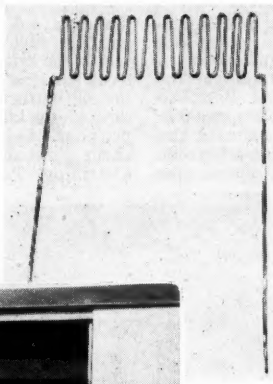
A general view of the new kiln for firing china gloss, with (right) truck being admitted to the kiln

From door to door the kiln is 100 ft. long, the overall height and width each being 7 ft. 6 in. The firebrick walls, including insulation, are 2 ft. 9 in. thick. Specially designed trucks constructed mainly of insulating firebricks, 4 ft. 6 in. long by 1 ft. 6 in. wide and 3 ft. high are admitted to and leave the kiln at the rate of one truck an hour. Each truck has a net capacity of 22 cu. ft., excluding the superstructure, so that the load passing through the kiln is approximately 700-800 lb. per hour. Driving the continuous propelling chain through reduction gear is a 1-HP Crompton Parkinson motor running at 1,420 RPM.

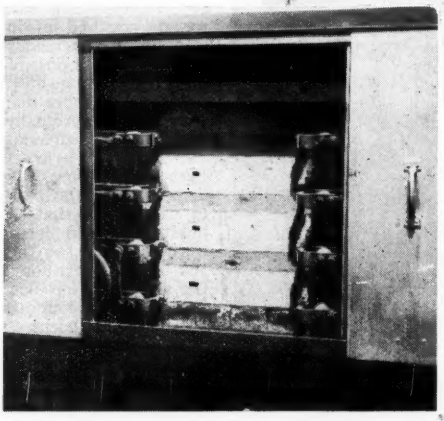
The heating elements incorporated in the kiln are remarkable not only for the way they are constructed, but also for the method of installation which renders replacement possible without shutting down the plant for more than a few minutes. Actually, however, the inventor of the kiln, Major Bernard J. Moore, who demonstrated the plant to us, tells us that the question of replacing the elements has not yet arisen. Although the apparatus has been in use for twelve months not one of the elements has failed, or, for that

matter, shown any deterioration so far as can be ascertained whilst still in operation.

Instead of being wound on porcelain formers, the elements are fabricated of heavy-duty nichrome tape of sufficient gauge to support its own weight. To reduce heat losses the leads, which are welded on, are constructed of much heavier cross - section nichrome while the cold ends are of solid nickel. Each element which consists of about 40 ft. of tape, bent in the form of a regular zig-zag, is capable of carrying a load of up to 3 kW, but the maximum loading is seldom utilised, this being one of the principle features responsible for the long life of the elements. Experimentally, the elements have been subjected to a 100 per cent. overload to operate at temperatures exceeding the normal.



One of the elements



A portion of the side of the kiln showing position of elements and how they are connected up

Ninety-six separate elements are employed in the kiln, forty-eight being arranged on each side. The position of the elements at the sides is a departure from the practice hitherto adopted for this type of kiln, which has favoured top location. It is this special patented feature which is the secret of the simple method of element replacement, the individual elements being inserted into the kiln wall in firebrick trays or drawers which, being only lightly cemented in, can readily be removed. Should an element fail all that is necessary is to shut off the supply, immediately withdraw the appropriate tray with the faulty element and replace it with a new one ; it is unnecessary to wait for the kiln to cool down before effecting the repairs.

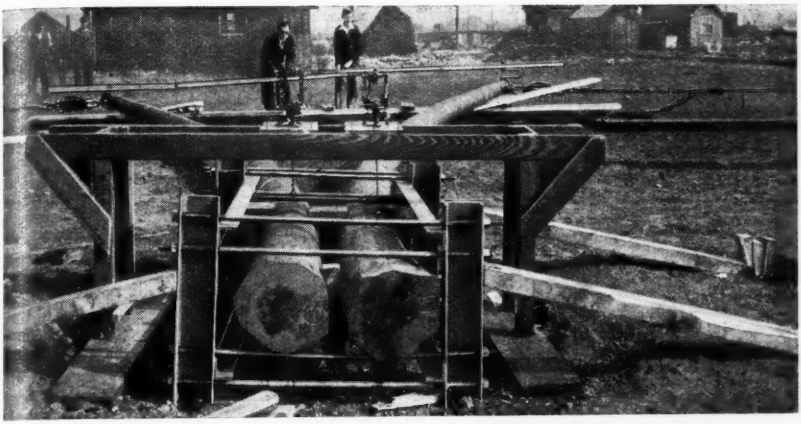
In the kiln in question the elements are arranged in tiers of four and normally ten are placed in series on the 200-V supply, though the number in series is altered in order to regulate the heat at any particular part of the kiln. Further delicate adjustments of temperature at certain points are secured by having a number of elements connected to a 25-kVA " Transreg " voltage regulator, arranged to give any voltage variation below 200 V. This has been supplied by the Metropolitan-Vickers Electrical Co.

The kiln is divided into three zones—the far preheating, the near preheating and the fire zones. Automatic regulation is secured in all three zones by a Cambridge regulator with a 3-point recorder operating on the contactor principle. The average loading is about 160 kW. As the number of elements can be varied and as any particular element can be connected with the supply from the transformer, it will be appreciated that an almost infinite flexibility of temperature variation, both horizontally and vertically, can be obtained throughout the length of the kiln. The control panel used is a 5-cubicle "Metrovick" unit covering main and four isolating switches, the three heating zones and the transformer supply. Distribution is by means of a neat linkbar system connecting busbars.

We should like to thank Mr. J. F. Gimson, managing director of the Porcelain Co., for granting us permission to inspect the kiln and also Major Moore for giving us the technical description. Certain features in the design and construction of the kiln have been patented and it has been constructed by Bernard Moore Tunnel Kilns, whose address is 82, Liverpool Road, Stoke-on-Trent.

Lift Makers' Association

Owing to the expansion of its activities since its formation in 1932 the National Association of Lift Makers has recently re-organised its secretariat. The offices of the Association are now at 36, Kingsway, London, W.C.2 (tel.: Holborn 0502) and the secretary is Mr. T. M. H. Stubbs.



British Wood Poles

Tests on Larch and Scots Pine

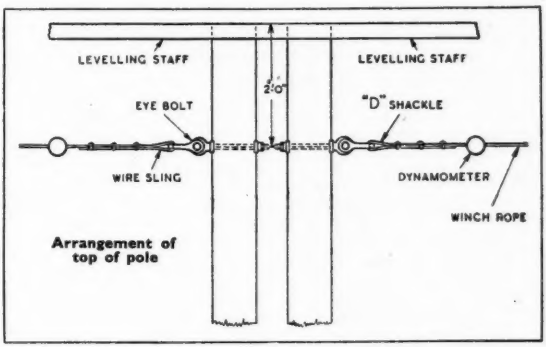
THE fact that only scanty information has hitherto been available on home grown timber gives especial value to tests recently carried out by the Yorkshire Electric Power Co. at the works of Armstrong Addison & Co. The two species of tree regarded as most suitable are larch and Scots pine creosoted by the Ruping or empty-cell process in compliance with B.S.S. 913/1940.

Larch is one of the toughest of soft woods, seasons rapidly and has an average weight of 37 lb. per cu. ft. when seasoned. To conform with B.S.S. 513/1933 larch should have a strength at the critical cross-section of 4,260 lb. for a 36 ft. by 11½ in. unsupported pole planted at 6 ft. The load is calculated for a modulus of rupture of 10,000 lb. per sq. in. and a modulus of elasticity of $1{\cdot}64 \times 10^6$ lb. per sq. in.

Scots pine has a seasoned weight of 30 lb. per cu. ft. The theoretical breaking load of a 36 ft. by 11½ in. pole at 5 ft. from the butt planted at 6½ ft. is 3,300 lb., and the modulus of rupture is taken as 7,800 lb. per sq. in.

One object of the present tests, which were carried out by Dr. J. McCombe, of the Y.E.P. Co.'s staff, was to measure the average deflection of poles rigidly supported at 5 ft. from the butt for any given loading, up to the ultimate load, applied at 2 ft. from the top of the pole. A second object of the investigation was to ascertain the ultimate breaking loads and a third to calculate the average value of fibre stress.

Six poles of each kind of wood, 36 ft. by 11½ in. diameter at 5 ft. from the butt and 8 in. at the top, were selected before creosoting which was done six days before the tests.

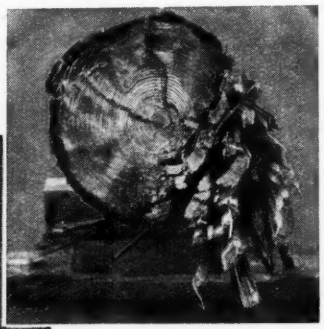


Arrangement of top of pole

The method of testing simulated the worst conditions of loading, *i.e.*, a rigid foundation such as is provided by a frozen ground. Pairs of poles were placed horizontally with their axes parallel and clamped together

rigidly 5 ft. from the butt by a channel-iron framework, 6 in. by 3 in. Shaped pieces of wood between the framework and the poles prevented damage to the surface of the latter. Four heavy wood struts driven against the framework precluded movement of the foundation.

An eye-bolt fitted at 2 ft. from the pole top was connected by a steel-wire rope to a winch and dynamometer for applying and measuring the loads. Friction between the poles and ground was minimised by placing two boards with rollers under the poles at a point about 6 ft. from the top.

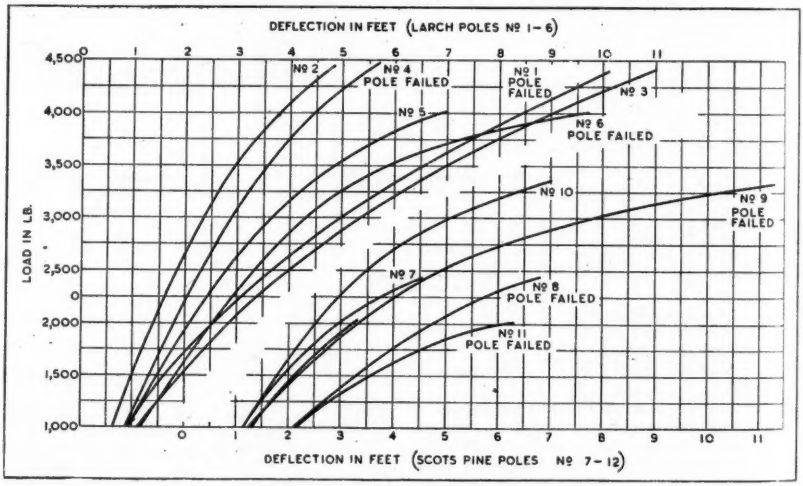


Close-up view of fracture of Scots pine pole and (left) larch pole

The load was applied equally at both sides of the poles at 2 ft. from the top until one of the poles failed. The deflection was measured at each stage by two theodolites, over the centre lines of the poles and fitted on a platform that was independent of the foundation framework, in conjunction with two levelling staffs. One levelling staff was fixed to each pole top by a swivel clamp to give readings at right-angles to the telescope axis, the selected zero mark aligning with the centre of the top of the pole. The theodolites were directed to these zero readings and then clamped in this position. As the poles were deflected the staffs moved horizontally and the theodolite readings gave the deflections for the applied load. The results were recorded in the form shown in table on page 379.

The fibre stress in lb. per square inch was calculated as twelve times the bending moment in lb. ft. divided by the section modulus, *i.e.* $\frac{\pi D^3}{32}$, where D is the diameter in inches of the pole measured at the point of fracture.

The results of these tests indicate that Scots pine is much more elastic than larch, but its ultimate fibre strength (6,500 lb. per sq. in.) is much less than that of larch (10,500 lb.), which accords closely with



Graph of tests on twelve poles

the figure of 10,000 lb. per sq. in. given in B.S.S. 513. As an average load of 4,443 lb. was required to break larch poles, compared with the 2,800 lb. for Scots pine poles, the span length permissible with the latter should not exceed 63 per cent. of that for larch. The ultimate fibre strength of Scots pine is considerably below the value generally assumed for Baltic fir (6,500 lb. per sq. in. as compared with 7,800 lb.). No relationship is apparent between ultimate load and initial moisture content, which in the tests averaged 28 per cent. in the case of larch and 53½ per cent. for Scots pine.

Creosote penetrates Scots pine (2⅜ in.) much more deeply than it does larch (½ in.). The fracture of larch spreads over a considerable length and is very fibrous, the successive fibres breaking noisily, whereas in the case of Scots pine it has been found that short well-defined breaks occur with little audible warning.

RESULTS OF TESTS

Type	Point of fracture above clamping point	Ultimate load	Diameter at fracture	Calculated fibre stress
	ft. in.	lb.	inches	lb. per sq. in.
Larch ..	5 2	4,480	11	9,806
Larch ..	3 4	4,592	11	10,820
Larch ..	3 0	4,256	10⅜	10,870
Scots Pine	8 8	2,688	11	5,018
Scots Pine	3 2	3,472	10⅜	8,818
Scots Pine	3 5	2,240	10⅛	5,635

Ample Capacity in America

Edison Electric Institute's Survey

NO power shortage is likely in America this year, when the country's war effort is expected to be at its peak. This statement is made in the *Edison Electric Institute Bulletin* for January, which contains estimated figures of output and plant capacity for 1942.

Except for 1925, last year's net increase of 2,720,000 kW in generating capacity was the largest in the history of the industry. Nevertheless, a much greater advance—3,384,000 kW—is scheduled for the present year. To enable this high goal to be reached, construction of 2,800,000 kW of plant for long-term enterprises has been cancelled, and the net increases scheduled for 1944 and 1945 are thus only 521,000 kW and 195,000 kW, respectively.

AMERICAN ELECTRICITY SUPPLY STATISTICS

	1941	1942 (est.)
Plant capacity :	kW	kW
Steam	30,823,455	32,478,700
Hydro	12,263,587	13,273,900
I.c. engine	1,005,159	1,058,900
Total	44,092,201	46,811,500
Electricity generated :	million kWh	million kWh
Steam	115,276	123,500
Hydro	51,262	63,200
I.c. engine	1,632	1,800
Total	168,170	188,500
Net imports	927	1,500
Sales to consumers : ..		
Residential	25,124	27,000
Rural	2,352	2,900
Commercial	100,688	115,350
Railways	6,078	6,600
Public authorities ..	5,818	6,950
Total	140,060	158,800
Number of consumers ..	31,607,371	32,215,888

The sum of the non-coincident peak loads on generating stations in December was estimated at 37,000,000 kW. This was nearly 10,000,000 kW less than the installed capacity, the margin of reserve being 1,000,000 kW more than in the previous year. For the larger utilities the peak load figure (33,000,000 kW) was 8 per cent. below the estimate of a year ago and nearly 20 per cent. below the Federal Power Commission's estimate of eighteen months ago. Daylight saving, insufficient allowance for decrease in the non-defence industrial load, and failure of the war loads to materialise as rapidly and as much as anticipated are said to be responsible for these over-estimates.

Last year electric utility companies spent $482,000,000 on new construction against a budgeted expenditure of $622,000,000. This curtailment was largely in distribution and general plant. In 1941 $592,000,000 was spent.

It is estimated that 188,500 million kWh was generated last year by all agencies contributing to the public supply. The increase over 1941 was 12 per cent., this rate of growth being somewhat less than in the latter year (16 per cent.). Production by fuel plants rose by 7 per cent. In hydro-electric generation there was an abnormal gain of 23 per cent. following the breaking of the drought which had prevailed east of the Mississippi for the better part of a year.

Output of Industrial Plants

In addition to the public supply, some 46,500 million kWh was generated by manufacturing and mining plants, so that the aggregate production of power in the United States last year was approximately 235,000 million kWh. This is estimated to be about two-fifths of the world production, which is put at 600,000 million kWh.

In spite of the practical stoppage of sales of household electrical appliances early in the year, residential supplies rose by 7·5 per cent. in 1942, and the average per consumer was 1,024 kWh, an increase of 38 kWh. The price of electricity for domestic use continued its steady decline, from 4·04 to 3·68 cents, in contrast to the upward movement in other commodities.

In a review of the finances of the American electricity supply industry the Institute states that except for taxation these were, in general, satisfactory. Last year the total of all taxes (Federal, State and local) was about $635,000,000, twice as much as four years ago although revenues have only increased by a third.

Red Cross Appeal

Further Subscriptions and Donations

A NOTEWORTHY feature of the fourth list of contributions to the Electrical Industries Red Cross Fund which we print below is the predominance of single donations over covenanted subscriptions. The latter, of course, are particularly welcome; not only do they ensure a regular income while the war lasts but the collection of income tax upon the annual contributions doubles the revenue to the fund. Moreover they relieve the donors of the trouble of sending separate sums year by year, which is no doubt the intention of many concerns in the "donations" list. Nevertheless, single donations are very acceptable and are helping to make the appeal a success.

This week's list again indicates the widespread nature of the response both geographically and sectionally. It includes the names of manufacturers, electricity supply authorities, contractors and wholesalers.

Covenanted Subscriptions (gross)

	£	s.	d.
Brought forward ..	6,562	10	0
Higgs & Hill, Ltd.	100	0	0
Hopkinsons, Ltd.	100	0	0
Mersey Power Co.	50	0	0
Mid-Cheshire Electricity Supply Co.	50	0	0
Borough of Rochdale	63	0	0
J. M. Webber & Co., Ltd. ..	10	10	0
Grelco, Ltd.	10	0	0
Abell & Smith's Electrical Co., Ltd.	10	0	0
E. H. Westmoreland, Oakham, Rutland	4	4	0
Aldeburgh Elect. Supply Co., Ltd.	4	4	0
J.E.J. Goundry, Reigate ..	2	0	0
E. Kirby, Thornaby, Yorks ..	2	0	0
Total	£6,968	8	0

Donations

	£	s.	d.
Brought forward ..	3,781	6	3
British Thomson-Houston Co. ..	500	0	0
Metropolitan-Vickers Elect. Co.	500	0	0
Ever Ready Co.	250	0	0
Edison Swan Elect. Co.	100	0	0
Borough of Brighouse, Yorks ..	25	0	0
Woking Electric Supply Co. ..	25	0	0
St. Helens Electricity Dept. ..	21	0	0
British Central Elect. Co., Ltd. ..	10	10	0
Bective Electrical Co., Ltd. ..	5	5	0
T. Clarke, Chelsea	5	5	0
F. R. Wright & Co., Leicester ..	2	2	0
Electrical Engineers, Ltd., London W.C.2		15	6
Total	£5,226	3	9

Forthcoming Events

Institution of Electrical Engineers.—Monday, March 22nd, 5.30 p.m. Informal discussion on "Electrical Possibilities of Prefabricated Buildings," to be opened by Mr. G. Smith. Thursday, March 25th, 5.30 p.m. Paper: "Engineering Economics," by Sir Frank Gill, K.C.M.G., O.B.E. (Joint meeting with the Institutions of Civil and Mechanical Engineers).

West Wales (Swansea) Sub-Centre.—Saturday, March 20th. 3 p.m. Mackworth Hotel. Discussion on "Earthing," to be opened by Prof. R. O. Kapp.

North-Western Centre.—Saturday, March 20th, 2.30 p.m. Engineers' Club, Manchester. Paper: "Coal for Steam Raising," by Mr. J. N. Waite.

North-Western Wireless Group.—Friday, March 26th, 6 p.m. Engineers' Club, Manchester. Paper: "The Measurement of the Characteristics of Concentric Cables at Frequencies between 1 and 100 Mc/s," by Dr. T. I. Jones.

East Midland Sub-Centre. — Wednesday, March 24th, 3 p.m. Nottingham. Short informal papers.

South Midland Students' Section.—Wednesday, March 24th, 6.30 p.m. James Watt Institute, Birmingham. Paper: "Foundations of Line Telephony," by Mr. S. P. Roper.

North Midland Students' Section.—Saturday, March 27th, 2.30 p.m. Griffin Hotel, Leeds. Paper on "Economics," by Mr. W. E. Allen.

Association of Mining Electrical and Mechanical Engineers.—Saturday, March 20th. 5.45 p.m. S. Wales Institute of Engineers, Cardiff. Paper: "Mercury Arc Rectifiers and their Application to Mining," by Mr. G. Tillcock.

Royal Society of Arts.—Monday, March 22nd, 1.45 p.m. Institution of Electrical Engineers. Second of four weekly Cantor Lectures on "The Modern Power Station"—"Coal and Ash Handling Plant," by Mr. J. F. Roy Mitchell.

Birmingham Electric Club.—Monday, March 29th, 5.20 p.m. Grand Hotel. Annual meeting. 6 p.m. Paper on "Plastics," by Mr. J. Jarman.

Society of Chemical Industry.—*Chemical Engineering Group.*—Wednesday, March 31st, 2.30 p.m. London School of Hygiene, W.C.1. Paper: "Design of Drying Machines for Agricultural Products," by Dr. W. H. Cashmore.

North East Coast Institution of Engineers and Shipbuilders.—Friday, March 26th, 6 p.m. Lecture Theatre of Mining Institute, Newcastle-upon-Tyne. Paper: "Modern Heat Insulating and Decking Materials," by Dr. Ezer Griffiths.

Institute of Welding.—Wednesday, March 31st, 6 p.m. Institution of Mechanical Engineers, Storey's Gate, S.W.1. Paper: "A Development in Welded Fabrication for Merchant Shipbuilding," by Messrs. R. B. Shepheard, R. Boardman and C. J. Jensen.

Heating Economy

Distributing the "Ration" Equitably over the Season

By R. Grierson, M.I.E.E., M.I.Mech.E.

IN a previous article* it was shown that the power developed by space-heating machines of the hot-water radiator type could be effectively governed at all points between no-load and full-load merely by adjusting the temperature of the water flowing from the water-heater or "boiler" to the radiators. The question which naturally arises is the nature of the daily and weekly adjustment required in order that these machines may be effectively and efficiently operated and the fuel "ration" distributed equitably over the heating season.

Thanks to the Meteorological Office, a large amount of statistical data is available on the mean air temperatures over the British Isles, but I cannot trace that anyone previously has considered this aspect of space-heating or arranged the available data in a manner in which it could be readily applied to fuel economy problems and the efficient performance of space-heating machines.

In "The Book of Normals of Meteorological Elements for the British Isles for Periods Ending 1915," published by the Meteorological Office, Air Ministry (H.M. Stationery Office, 1920, 9d. net), the mean temperature for every week in the year is given for each of twelve areas into which the British Isles have been divided for the 35-year period from 1881 to 1915. The weekly and monthly values for the heating season given in the accompanying table were extracted for No. 3 Area, England East (which covers approximately the counties of Norfolk, Suffolk, Essex, Cambridge and Hertford) in order to obtain a convenient standard of reference.

Mr. R. Grierson is electrical and heating engineer to the Northmet Power Company

The mean monthly values are not the averages of the weekly value, but are reproduced from another table in the Book of Normals. Discrepancies are due to varying lengths of periods, *i.e.*, 28-, 30- or 31-day months as compared with four- or five-week periods. Although the mean temperature has shown an inclination to rise very slightly during recent years, the values quoted are sufficiently accurate for the immediate purpose, *i.e.*, fuel economy.

In the majority of buildings where occupants are employed on sedentary work, *e.g.*, clerical duties or assembly of small components at benches, the mean air and radiant temperature for the optimum conditions of thermal comfort and production output is generally recognised as being about 63 to 65 deg. F. in conditions of "still air" or negligible air motion, as compared with the 55

Ranges of temperature conditions by weeks and percentage of weekly and monthly consumptions of energy from week ending October 7th to week ending June 3rd.

Month		Mean external temperature deg. F.	Balance to 60 deg. F.	Equivalent degree-days	Per cent. of seasonal total
October,	4 weeks	52 to 47	8 to 13	56 to 91	1·40 to 2·27
	31 days	49·6	10·4	322	8·0
November,	4 weeks	47 to 42	13 to 18	91 to 126	2·27 to 3·15
	30 days	43·5	16·5	495	12·3
December,	5 weeks	41 to 38	19 to 22	133 to 154	3·32 to 3·86
	31 days	39·5	20·5	635	15·8
January,	4 weeks	38 to 37	22 to 23	154 to 161	3·86 to 4·02
	31 days	37·9	22·1	685	17·1
February,	4 weeks	39	21	147	3·66
	28 days	38·8	21·2	595	14·8
March,	4 weeks	39 to 42	21 to 18	147 to 126	3·66 to 3·15
	31 days	41·1	18·9	585	14·6
April,	5 weeks	43 to 48	17 to 12	119 to 84	2·98 to 2·10
	30 days	45·6	14·4	430	10·7
May,	4 weeks	48 to 53	12 to 7	84 to 49	2·10 to 1·22
	31 days	51·3	8·7	270	6·7
June,	1 week	56	4	28	0·70
	35 weeks				
	245 days	43·6	16·4	4,017	100

* "Space-Heating Machines," by R. Grierson, *Electrical Review*, November 27th, 1942.

deg. F. usually maintained for staircases, corridors, stores, etc., so that the *mean* building temperature is usually approximately 60 deg. F. during the period of occupation.

It follows that, since the rate of flow of heat energy is proportional to the *difference* in temperature between the heated space and the ambient external air and to the period of time during which this thermo-potential is maintained, the next step is to co-ordinate these two quantities in one compound unit of the ampere-hour type which may be either in the form of degree-hours or degree-days. Thus, if an internal temperature of 60 deg. F. is maintained from an external temperature of 40 deg. F. for a period of twenty-four hours, the thermo-potential inducing the flow of heat energy is 60−40 or 20 deg. F. The product 20 deg. × 24 hr. = 480 degree-hours or 20 degree-days.

In order to illustrate the principle, the values for three days are shown in fig. 1, which indicates the daily percentage of maximum energy consumption required to maintain an internal temperature of 60 deg. F. between 9.0 a.m. and 5.30 p.m. in an office building during March, 1942. The areas of the irregular black rectangles represent the values of the degree-hours or degree-days, also the net heat energy required per day during the period of occupation. Thus, a maximum thermo-potential of 28 deg. F. × 24 hr. = 670 degree-hours or 28 degree-days, and 4·67 degree-days on Monday = 4·67 × 11/28 = 16·7 per cent.

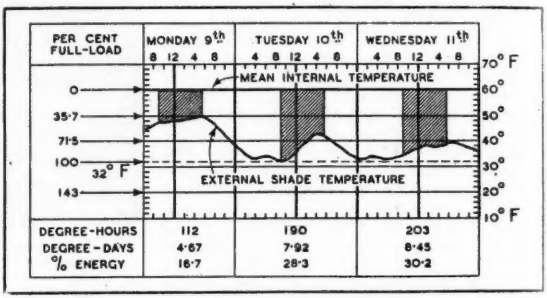


Fig. 1.—Daily percentage of maximum energy consumption to maintain an internal temperature of 60 deg. F. between 9 a.m. and 5.30 p.m. in an office building during March, 1942

In the table the weekly and monthly mean temperature values have each been deducted from the maintained mean building temperatures of 60 deg. F. and have been multiplied by 7 days, the resulting products being the number of degree-days for that week. For the monthly summaries, the appropriate factor is the number of days in the month.

Since the thermal resistance represented by the walls, floor, ceiling or roof and windows of the building remains substantially constant throughout the heating season, the rate of flow of energy through them can be shown to be expressed by $F = \frac{t_2 \text{ deg. F.} - t_1 \text{ deg. F.}}{R}$ and it follows that if "T" = $t_2 - t_1$, then the percentage of heat energy used during any week or month of the heating season should be approximately proportional to the mean temperature *difference* or thermo-potential "T" maintained during the period, multiplied by the number of hours or days during which it was maintained. For example, if the number of degree-days for one week is found to be 210 and for the next week 105, the energy consumption for space heating for the two weeks for the normal building (other things being equal) would be in the ratio of 2 : 1.

Data of the type given in the table provides the "yardstick" for the "standard" or average heating season, but for accurate work it is necessary to ascertain the weekly and monthly mean temperatures for the current season *in the vicinity of the installation* either from the daily readings of a maximum and minimum thermometer or from the weekly chart provided by a standard thermograph placed in a "Stevenson" screen at a height of 4 ft. above a grass-covered plot.

Acknowledgments are due to the Director of the Meteorological Office, Air Ministry, and to Capt. J. M. Donaldson, general manager of the Northmet Power Co., for permission to publish the data in this article.

Power Station Performance

THE principal items that have contributed to the better performance of coal burning power generating stations during the last ten years are reviewed by Messrs. M. N. Karaosman and G. T. Shears in a paper prepared for the I.E.E. London Students' Section.

Statistics issued by the Electricity Commissioners are quoted to show that the thermal efficiency of power stations has in some recent stations risen to nearly 30 per cent. The principles involved in the generation of electricity with the aid of steam produced by burning coal are summarised, starting with the heat cycle, showing that boiler feed water heating permits a gain in efficiency of 5 per cent. at the first stage, 3 per cent. at the second, with progressive reductions. The importance of high condenser vacuum is emphasised and the effects of raising the pressure and/or temperature of the steam explained. In mentioning the benefits to be derived from generation directly at 33 kV, reference is made to the 0·5 per cent. higher alternator efficiency that is obtainable and the initial cost saving of 10s. per installed kW over the transformer-coupled counterpart.

Domestic Wiring

Possible Future Improvements

IN last week's *Electrical Review* the two-part paper on "The Future of the Domestic Wiring Installation" by Messrs. Forbes Jackson, W. J. H. Wood, G. Smith and E. Jacobi was given in abstract.

The discussion at the Institution of Electrical Engineers on March 11th was opened by Mr. H. T. Young (Past-President of the Institution), who, dealing with adequacy of supply, said that the suggested provision for a supply up to 16 kW for the average house was quite reasonable. There should be an adequate number of switches provided, including two-way switches for lighting, and plugs should be controlled by switches. For reliability there should be fewer circuits and local fusing of the plugs.

Mr. Young said that no excuse was needed for providing a really good electrical installation in every home. Now was the time to begin to design houses and buildings with a view to safety, and he hoped the Ministry of Works would have some form of safety committee watching over design.

Mr. E. H. Miller suggested that in a diagram in the paper of a combined intake and service panel the space allowed for the meter was not sufficient to contain many of the meters at present on the market. The meter should be readily accessible and he suggested that it might be attached to the door at the front of the panel, to facilitate inspection.

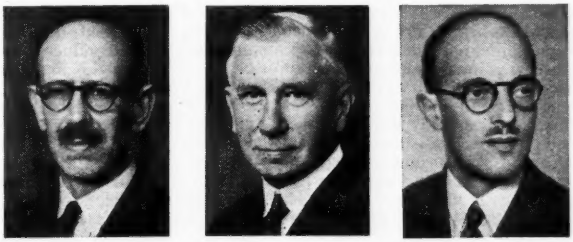
Small Current—High Cost

Mr. J. W. J. Townley (West Ham) said that the first cost of the small-current-consuming apparatus, such as refrigerators and washing machines, was very high. He knew of only one undertaking in the country which hired washing machines, and that was West Ham, and the rates were so high that those machines were hired only in hundreds, whereas cookers were hired in thousands.

Referring to the fitting of a 10-A fuse in a plug top, Mr. Townley said it would be quite simple, in the case of a 2-kW fire, to put the fuses on the apparatus itself and not in the plug-top; the fused plug-top could be used for apparatus taking 2 or 5 A.

As to the use of light gauge tubing, he asked for some indication of the kind of grip joint recommended, and wondered how the tubing would react when embedded in certain cements containing deleterious substances sometimes used in floors.

Mr. H. Marryat (Marryat and Place) suggested that in a large estate, for example, a group of the smaller dwellings should be designed to be all-electric. Possibly the demand for such dwellings would point the way to future progress. He believed the demand for all-electric houses and flats would prove to be great and increasing. He expressed a preference for screwed conduit. It was cheaper and recent independent tests, he believed, had shown 100 per cent. better results for screwed barrel than for grip joint light tubing.



Three of the authors of the "Domestic Wiring" paper:—Messrs. Forbes Jackson, W. J. H. Wood and E. Jacobi

Plastic Cables

Mr. S. W. Melsom (Cable Makers' Association) said that the virtues of rubber were not entirely reproduced in the plastic materials used for cables, and he believed that rubber would be used to quite a large extent in the future, though plastic cables would survive.

Mr. R. H. Rawll (Birmingham) considered that the I.E.E. Wiring Regulations had been a hindrance rather than a help to development. The technicalities and the safety precautions were such that he did not think it was possible to cover them in any one manual. He applauded the suggestion that the Regulations might in the future copy the system of the Home Office Regulations, but the basic principles should be mandatory.

There should be agreement on one size of plug, an adequate number of plugs and an adequate size flexible. Regarding the suggestion that only a two-wire service

should be taken into the houses, he pointed out that, with development, it was sometimes necessary to change a supply to another phase; it would be desirable, therefore, to design the service box in such a way that it could take a three-core service.

Mr. L. W. Hayes (B.B.C.) urged that those responsible for wiring homes and for providing the broadcast service should do something to avoid the radiation of electrical interference. The Institution had already put out a report on electrical interference, and he hoped that after the war it would be possible for that report to be implemented fully.

Mr. J. W. Leach (Central London Electricity) said that he had a house wired with 7/·029 cable, with 2-kW fires and 10-A sockets, and everything was operating satisfactorily. He was a firm believer in a metal enclosure right up to the meter at least. By eliminating the consumer's main fuse there was much better prospect of discrimination as between the supply authority's cut-outs and the consumer's fuses. Manufacturers should give very careful consideration to the standardisation of terminal positions and dimensions, so that consumers could buy a common fuse anywhere, and buy it cheaply. Finally, he suggested an additional earth wire, instead of relying on the conduit for continuity.

Commissioners' Regulations

Mr. F. C. Raphael, commenting on regulations, said that we already had the Electricity Commissioners' Regulations, which were virtually all that was necessary if the installation were carried out by a competent firm of contractors or a consulting engineer were employed.

Mr. Plummer said he had had 15 years' experience of the use of light-gauge conduit and for housing work it was the best that could be used. Its capacity was greater than that of screwed conduit of corresponding size, which was advantageous where space for concealing the conduit was very restricted. With regard to the use of plugs on a ring main circuit, he was all in favour of the small cartridge fuse in the plug top. If any fault developed in a small piece of apparatus, the consumer was then able to take the whole of it to a contractor for repair.

Mr. C. King considered that the best system would be to provide a 10-A plug in each room, protected by a small circuit breaker or a 10-A fuse locally fitted to the plug, small flexibles being connected to 2-A sockets and each end of the ring main connected separately to the supply through a 15-A fuse. The use of small circuit breakers would not add more than 25s. to the total cost. He expressed a preference for screwed conduit and did not agree that the I.E.E. Rules had imposed unnecessary restrictions on the use of electricity in the home.

Mr. A. Cunnington (Southern Railway) illustrated a simple system of socket outlets from wiring carried in a duct at dado level. Socket outlets, he said, could be provided where required; it was necessary only to bare the wire in the duct, press the clip of the socket into position, and screw tight. If it were desired to change the position of an outlet, the socket could be moved to the required new position and the wiring made good at the original outlet position.

Built-in Apparatus

Most domestic apparatus could quite well be connected to a 5-A outlet. Large apparatus, such as fires of 2 or 3 kW, should be built-in or permanently connected.

Mr. G. Davidson (Kennedy & Donkin) discussed a scheme using a small-section twin conductor run round the skirtings from a single main switch fuse. Mr. E. E. Hutchings (E.R.A.) said that, given a reasonably high standard of material and workmanship, a heavy-gauge screwed system had little or no advantage over light-gauge tubing with grip joints on domestic services.

Mr. L. B. S. Golds pleaded for the use of the plug-in meter, which had been used in America and Canada for about eight years very satisfactorily to circumvent "current diversion." It was carried on a base having projections at the back which fitted into suitable receptacles. At least half an hour was required to change the ordinary fixed meter, whereas the plug-in meter could be changed in about five minutes.

Mr. Whatton agreed that the provision of wiring space behind skirtings should be carried to its logical conclusion, and suggested that there should also be provision for carrying telecommunication wiring, for there would be a demand for wiring for television sets, etc., after the war.

Mr. W. J. H. Wood said his experience had shown that just as good continuity could be obtained with grip-joint conduit as with the screwed type, but it was important, in both systems, to paint each joint immediately it was made, to prevent rusting.

The authors are to reply to the discussion in writing.

Rifle Shooting Competition

THE final results of the Mackworth Praed Cup for 0·22 rifle shooting have just been announced. The competition was open to teams from Home Guard platoons and a total of 2,332 teams entered. In the final stage the team entered by No. 4 Platoon, 60th Company, 23rd Middlesex Battalion (Everett, Edgcumbe Works) was placed second with a score of 975 out of a possible 1,000, the winning team scoring 978. The team are employees of Everett, Edgcumbe & Co., Ltd. The platoon is commanded by Lieut. W. House, H.G.

I.E.E. Wireless Group

Inaugural Meeting at Manchester

THE newly formed Wireless Group of the North-Western Centre of the I.E.E. held its first meeting at the Engineers' Club, Manchester, on March 12th, when the Group was launched with the good wishes of Prof. C. L. Fortescue (President, I.E.E.) and Dr. R. L. Smith-Rose (chairman of the Wireless Section Committee). At least 150 members were present.

Members of the Centre who are members of the Wireless Section automatically acquire membership of the Group. The Group is operated by a provisional committee, which will retire at the annual meeting on April 30th, when a committee will be elected in the usual way. The committee comprises: Professor Willis Jackson, D.Sc. (chairman), Messrs. S. E. Goodall, M.Sc., G. J. S. Little, G.M., B.Sc., J. L. Miller, D.Eng., E. B. Moullin, M.A., Sc.D., G. R. Polgreen, B.Sc., N. H. Searby, Ph.D., together with Messrs. L. H. A. Carr, M.Sc.Tech. (chairman of the North-Western Centre), T. T. Evans (hon. secretary) and A. L. Green (assistant secretary).

Mr. L. H. A. Carr, who opened the meeting, said that as provincial members were unable to go to the meetings in London of the Wireless Section, it became apparent that there was need of a similar style of organisation in the provinces. The Central Committee had been considering this matter for two or three years. Owing to the war, some of the sectional formations had not been pressed, but it was considered this was the opportune time to set up a Wireless Group.

Professor Willis Jackson, chairman of the Group Committee, said that it was hoped that younger members would take an active part in the discussions and in the preparation of papers.

President on Sectionalisation

Professor Fortescue said this new group had one forerunner—at Birmingham, 15 years ago, during the year in which he was chairman of the Wireless Section. This Birmingham group had died a natural death quite soon because it did not have the right background. Now the wireless industry had a scientific foundation, and he prophesied that the new Group would be a completely successful venture.

Sometimes people thought that there should not be too much sectionalisation because as electrical engineers they all had the same background. He did not agree with that view. The Sections of the Institution and the Groups in the Centres had been formed in order to provide for the more intimate discussion of matters in which members were actively engaged at the moment.

It had been suggested that there should be more sections—one for education and another for generation. These proposals had been debated at great length in Council. It was perhaps premature to organise separate sections at present, but it might well be that they would have Education and Generation Sections at a later date, if they were really required.

The President went on to say he had heard it said the Institution was not sufficiently democratic, that it was overloaded with elderly gentlemen and that the younger people did not have their chance. He wondered if those who sometimes criticised the representation of the associate membership grade realised that over 75 per cent. of the associate members had been associate members for more than ten years. Did those who criticised really hold that a man who had been an associate member for ten years and was not good enough to become a full member, but who was good enough as an engineer, should have a leading part in the running of the Institution? Personally he did not think so. If a man was good enough as an engineer why did he not take up full membership?

Mr. W. K. Brasher (Secretary I.E.E.) said the formation of groups in local centres was a very rational move. In a session of eight or twelve meetings it was not possible to cover all the subjects which ought to be discussed. The only solution was group meetings where there was a community of interest in particular topics.

Uses of Quartz Crystals

Capt. C. F. Booth then introduced a discussion on "Quartz Crystal Applications" in the field of communications.

Dr. R. L. Smith-Rose said that the use of quartz crystals was a remarkable instance of development in a comparatively short period of time, for the control of the frequency of transmitters. Mention had been made of a quartz clock driven by a quartz crystal oscillator. On the figures given its limit of variation was only one second in three years.

He would not like the impression to be formed that wireless was a subject of very precise measurements. Frequency was only one thing which could be measured to anything within one per cent. In many fields of wireless it was not necessary to measure everything very accurately.

Others who took part in the discussion were Messrs. P. F. Condy, H. A. King, G. R. Polgreen, J. Baggs, J. D. Hinchcliffe, T. B. D. Terroni, Dr. E. B. Moullin and A. G. Thomson. Questions were raised as to the possibility of crystals being used in superheterodyne receiving sets and as to the extent of our dependence upon an adequate supply of quartz brought from overseas. The future of the crystal industry might depend on the manufacture of large sizes of quartz crystals if they could be obtained from other sources. Perhaps home sources of supply could be located, if sufficient trouble was taken to find them. With regard to the ageing of crystals, one theory was that it was due to the leakage of particles of quartz in the troughs of the crystal surface, caused by grinding and lapping. A cleaning process was sometimes a useful ameliorative. The ageing effect or falling off in activity seemed to be proportional to frequency.

Capt. Booth replied to these and many other points. He said there were quartz deposits in this country but they were useless for the purposes under discussion.

Sir George Lee proposed a vote of thanks to the speakers.

Provincial Supply Association

Electricity and Post-War Planners

ONE hundred and fifteen companies were represented at the annual meeting of the Provincial Electric Supply Association held on February 24th. Mr. Selwyn S. Grant, O.B.E., the chairman, presided and mentioned that the membership had increased by five during the past year. Since the last meeting Lt.-Col. S. E. Monkhouse, Mr. R. W. Wickham and Mr. E. C. Mekie had joined the Executive Committee. Mr. Grant also referred to the knighthood conferred on the hon. secretary, Col. Sir John Dalton and to the death of Mr. D. Robertson, chief accountant to the County of London Co.

He paid a tribute to the work of the Joint Committee of Electricity Supply Associations. It would be of immense value to the supply industry if one association could speak on its behalf. They appreciated that there must be a divergence of views to some extent, but they still hoped that the industry would be able to speak with one voice on a good many questions, particularly in post-war planning.

Mr. Grant considered that the new Minister of Fuel and Power had shown a disposition to help which some of them had found most refreshing. With regard to the coal position, the success of the Committee looking after the distribution of coal to public utilities was recognised throughout the industry whose representatives were Sir John Dalton (chairman of the Committee) and Mr. J. W. J. Townley.

They hoped to inform member companies before very long what amounts should be reserved for war damage contributions in respect of last year and this year.

Bulk Trading Conditions

A matter of particular interest was the formation of a committee representing all electricity supply associations to consider generally bulk trading conditions under the Electricity Supply Acts. Their Association had nominated Messrs. Fippard, Fennell, Maguire and Harker as representatives. While there was inevitably a conflict of views and interests it was most necessary that there should at least be a general examination of the position.

During the year the National Joint Industrial Council had agreed to a further increase in the war bonus on wages which now stood at 4d. per hour. The question of a new increase had been raised. They viewed with misgiving these half-yearly applications which had no relation to the cost of living but were prompted by increases granted in other industries. He thanked Mr. Parkinson for his work on the N.J.I.C. and the National Joint Board.

Among the other matters with which the Association had dealt during the past year were the wear and tear allowance on public lamps, the effort by the Ministry of Supply to introduce into contracts the clause relating to taxation allowances and the agreement as to wartime arrangements relating to generating stations operating under the direction of the Central Electricity Board. The last-mentioned agreement was designed principally to protect the Board against financial loss due to the war. They had been assured that the agreement would not prejudice any approach for the reconsideration of the present grid tariff charges.

Referring to post-war planning schemes, Mr. Grant said that without any special knowledge or inquiry a number of the many committees set up by the Ministry of Works and Planning had put forward views as to the role electricity should play after the war. The Association intended to see that insofar as possible no consumer should be restricted after the war as to his choice of lighting, heating or cooking and that the industry had a voice in its own post-war planning and any scheme of reconstruction which might be put forward. There was room for improvement as distinct from wholesale reorganisation. He hoped that those appointed to consider post-war reorganisation would approach the problem with open minds, free from political bias. He had never been able to understand why their industry was a pawn on the political chessboard.

He concluded with thanks to Mr. A. J. Fippard (vice-chairman), Mr. I. R. G. Jones and Mr. E. G. Baker (assistant secretary).

After a discussion on pending war damage legislation the meeting approved the re-election of the Executive Committee *en bloc* for the ensuing year.

Coal Storage

WE have received from the Ministry of Fuel and Power a copy of a paper on "The Storage of Coal for Industrial Purposes" by Mr. R. A. A. Taylor, M.Sc., of the Fuel Research Station, Department of Scientific and Industrial Research, which contains a good deal of useful information for electricity supply authorities and other large users of coal.

Some of the well-defined conditions affecting safety of storage are set out: they include size of coal, size of store, height and site of stack, and the age, state and type of coal. Fine coal is said to be the cause of nearly all storage difficulties and it is recommended that stacking methods should not be such as to facilitate local segregation of sizes.

Ample ventilation secures dissipation of heat in a stack but is difficult to achieve. Less satisfactory but possibly simpler to carry out is the exclusion of ventilating currents of air. Regarding the size of stack the author says that fires have rarely been recorded in heaps of less than 200 tons. A safe height is said to be 8 ft. although the figure can be increased, for coal of a suitable size and type, up to 20 or 30 ft. Attention should be paid to the floor of the stack which should preferably be stone.

Any coal more than eight months old can be considered safe if there is no heating in the heap or if the heating is not increasing. Methods of keeping a look-out for heating are suggested and safe temperature limits are discussed. Ways of dealing with fires in stacks are outlined. The possible extent of deterioration of coal in stock and the indications of deterioration are surveyed.

Boiler Plant

Cantor Lecture on Recent Developments

THE first of a series of four Cantor Lectures on "The Modern Power Station" was held at the Royal Society of Arts on Monday, when Mr. E. L. Luly (Babcock & Wilcox, Ltd.), spoke of developments in boiler plant. These, he said, had been in the direction of larger individual units, higher steam pressures and temperatures and higher feed-water temperatures. Although the overall efficiency of the boiler unit had not been materially increased for many years, furnace temperatures had been raised due to improved combustion technique and the use of less excess air, while stack temperatures had been lowered by the adoption of air heaters. Higher furnace temperatures had led to the general use of water-cooled furnaces.

Pressure and Temperature

The highest pressure boiler in this country was the 1,900 lb. per sq. in. Loeffler plant at Brimsdown, whilst the largest was the 550,000 lb. per hour unit at Battersea (which operates at 1,420 lb. per sq. in.). Natural-circulation boilers were at work abroad up to 2,400 lb. per sq. in.

Temperatures exceeding 900 deg. F. were not yet widely employed. Although final steam temperatures might increase there was little to indicate that 600 to 700 lb. per sq. in. would not remain as the standard pressure.

By far the greatest capacity of boiler plant was composed of units of from 200,000 to 300,000 lb. per hour. Because of the safety and cheapness of interconnecting boiler units, the "one boiler per turbine" idea seemed unlikely to make any great advance.

Boiler efficiencies in British power stations had long since reached the point where further worth-while improvement was out of the question.

Advances in the overall efficiency of power stations during the past twenty years could be attributed to improvements in design, to better load distribution due to increased utilisation of the grid, to larger and therefore more efficient individual units, and to the raising of the basic cycle efficiency by the employment of higher steam pressure and temperature and feed-water temperature.

Since increased steam pressure in general required increased steam temperature (in order to avoid wetness of steam in the later turbine stages), the superheater constituted a considerable proportion of the total pressure surface; for a 600 lb. plant the percentage was 19, and for 1,400 lb. it was 25.

High feed-water temperature had a secondary effect in so far as the air heater had to absorb more heat. Although this quantity might be only one-third of that absorbed by the superheater, yet because of the low rates of heat transfer, the surface of the air heater might exceed that of all the other pressure parts. Thus at 600 lb. per sq. in. the air heater surface would represent 50 per cent. of the total, and at 1,400 lb. 74 per cent.

Mild steel was most widely used for superheaters at temperatures up to 850 deg. F., but expensive alloy steels must be employed for 900 deg. F. and over.

Close control of the final steam temperature was essential owing to variations in conditions due to changing qualities of coal and state of cleanliness of the superheater and boiler. This could be achieved by regulating the quantity of gas passing over the superheater or by attemperation.

Should steam temperatures exceed the values now considered to be the limit it might be necessary to introduce separately fired units in which the final 100 or 150 deg. would be imparted to steam previously superheated to 800 or 850 deg.

Despite high feed temperatures, the work to be done by the economiser increased with rising pressure. Thus the economiser surfaces at 600 lb. and 1,400 lb. were respectively 31 and 35 per cent. of the total pressure surface, while heat absorbtions were 7 and 10 per cent.

High-feed temperatures had led to the introduction of air heaters on a wide scale. Pulverised fuel could utilise air at a higher temperature than mechanical stokers. Pulverised fuel also had an advantage in its ability to maintain "test" conditions for longer periods.

Problem of Availability

Perhaps the most outstanding achievement during the past ten years had been the extent to which secondary air, both front and rear, had been developed. The most important problem facing the designer to-day was that of availability, *i.e.*, keeping the boiler and ancillary equipment clean over long periods. Increased ratings and reduced excess air had led to increased gas temperatures in the superheater zone. Large units were more difficult to keep clean than smaller units. The introduction by the Central Electricity Board of a deferred efficiency test and the formation of the Boiler Availability Committee, composed of various interests, were important attempts to bridge the gap between boiler and turbine availability. Results with water-lancing were encouraging.

PERSONAL and SOCIAL

News of Men and Women of the Industry

PLYMOUTH Corporation Finance Committee has recommended that the salary of the electrical engineer, **Mr. H. Midgley,** shall be increased from £1,400 to £1,600 per annum, and that the salary of the deputy engineer, **Mr. C. J. Hocking,** shall be advanced from £700 to £775, rising to a maximum of £825.

Mr. F. W. Hewitt, M.Sc., M.I.E.E., is shortly retiring from the position of assistant secretary of the Institution of Electrical Engineers. In this issue the Institution invites applications for the position, offering a salary of " about £1,000 according to qualifications and experience."

Mr. S. I. Ellis (North-Eastern Electric Supply Co.) has been re-elected chairman of the Northern Counties Area Committee of the British Electrical Development Association. **Mr. T. E. Daniel,** borough electrical engineer of Darlington, is vice-chairman.

Mr. H. Webber, who has been borough electrical engineer at Keighley since 1910 is to retire in September. Mr. Webber held appointments at Dover, Hastings and Sunderland, before going to Keighley, where for a period he was also manager of the Corporation tramways. The Corporation is advertising in this issue for a successor to Mr. Webber at a salary of £1,000 per annum rising to £1,250, plus cost-of-living bonus.

Following upon the resignation of **Dr. E. W. Smith** from the post of Director of Gas Supplies (reported last week), the Minister of Fuel has appointed **Mr. George Evetts** as Gas Adviser to the Ministry. It is stated that in order to ensure the closest co-operation between the Ministry and the gas industry, the Minister is in consultation with the president of the National Gas Council (**Sir David Milne-Watson**) and the president of the Institution of Gas Engineers (**Mr. E. V. Evans**).

Mr. W. I. Aitchison, consumers' engineer with the Paisley Corporation Electricity Department, has been appointed consumers' engineer with the Finchley Corporation Electricity Department. Mr. Aitchison takes up his new duties on April 1st.

At the last meeting of Dumfries Town Council the convener of the Electricity Committee stated that the undertaking was now classified as non-generating and accordingly the salary applicable to the position of electrical engineer and manager would be lower than that which their electrical engineer, **Mr. A. E. Roots,** was being paid. He was pleased to say that the arrangement would not affect Mr. Root's salary, but it would apply to his successor.

Mr. D. A. Russell, M.I.Mech.E., who, since April, 1940, has been personal engineering assistant to the chairman of the London Electric Wire Co. & Smiths, Ltd., has recently resigned to become chairman and managing director of the Dagra Engineering Co., Ltd. Mr. Russell, who was educated at Uppingham and King's College, London, was trained at the works of W. H. Allen, Sons & Co., Ltd., Bedford, subsequently joining British Insulated Cables, Ltd., for whom he carried out a number of important contracts between 1925 and 1934. In 1935 he joined Stewarts & Lloyds, Ltd., as assistant to the chief engineer, resigning five years later to take up the appointment with the London Electric Wire Co. In addition to his engineering interests Mr. Russell has in recent years devoted considerable attention to the production of aeronautical publications.

The marriage took place on February 27th at Siparia, Trinidad, British West Indies, of **Miss Joyce Collins,** daughter of Mr. and Mrs. Collins of Petrolia, Ontario, and Siparia, Trinidad, and **Mr. L. J. Wilson,** elder son of Mrs. Wilson and the late Mr. L. E. Wilson of L. E. Wilson & Co., Ltd., electrical engineers, Sale, Manchester.

We regret that in announcing the appointment of **Mr. B. Thomsett** to a post at Southend Technical College last week we described him as head of the electrical and engineering department of the Rutherford Technical College, Newcastle-upon-Tyne. Mr. Thomsett is head of the electrical department there. The head of the mechanical and civil engineering department is **Mr. E. Cardwell,** B.Sc., M.I.Mech.E.

Obituary

Mr. R. Dean.—We report with regret the death of Mr. Rennie Dean, general manager and chief engineer of the Luton Corporation electricity undertaking, which occurred on Monday last at the Luton and Dunstable Hospital. He was only forty-eight years of age.

Mr. Dean, before entering the electricity supply industry, gained experience with Siemens Bros. & Co., Ltd., the British Thomson-Houston Co., Ltd., and Vickers, Ltd. About nineteen years ago he joined the Kettering undertaking as distribution engineer and after seven years there went to Coventry as deputy electrical engineer and manager. He succeeded Mr. W. H. Cooke at Luton in March, 1939. Only last month the Luton Council, which had decided to defer the adoption of the Walker Scale until after the war, recognised Mr. Dean's services to the undertaking by agreeing to apply the scale in his case on April 1st this year.

Mr. Dean was a member of the Institutions of Electrical and Mechanical Engineers and had served on the committee of the South Midland Centre of the I.E.E. He was the author of a paper on " Design Data in Rural Distribution Lines," published in the I.E.E. *Journal* for December, 1935. Last year he was elected chairman of the Greater London, S.E. and E. England Centre of the Associated Municipal Electrical Engineers.

Mr. E. S. New.—A memorial service for the late Mr. E. S. New, whose death was reported in our last issue, was held at Clandon Parish Church on March 11th. In addition to members of his family, including his son, Lieut. John New, R.N.V.R., a number of prominent electrical men were present. Among them were Mr. J. Waddell, chairman of the D. P. Battery Co. and members of the company's staff; Sir Archibald Page and Mr. H. Hobson

(Central Electricity Board); Mr. J. W. J. Townley (I.M.E.A.); the Hon. J. R. Rea (B.E.A.M.A. and the Fair Trading Council); Mr. W. Riggs (E.C.A.); Mr. F. C. Vine (Accumulator Makers' Association); and several representatives of battery manufacturers.

Mr. H. A. Judge.—The death occurred recently at East Barnet, at the age of eighty, of Mr. Herbert Arthur Judge, J.P., chairman of Litholite Insulators & St. Albans Mouldings, Ltd.

Mr. G. B. Barham.—We regret to learn of the recent death of Mr. G. Basil Barham, who was editor of the *Contract Journal* from 1924 to 1941. In his earlier days he was an electrical engineer and was associated with the Edison & Swan Electric Light Co.

Mr. W. Marshall.—The death occurred on March 8th, at the age of eighty-four, of Mr. William Marshall, senior partner of William Marshall & Sons, electrical and radio engineers, Stirling.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Recommissioning Plant

I HAVE read Mr. E. H. Crook's letter in your issue of March 12th and, in view of the importance of the subject, feel that he should not be left " crying in the wilderness."

I would like to supplement Mr. Crook's remarks by pointing out that there are about half-a-dozen firms of repute and standing with the necessary facilities, who have over a number of years built up organisations for the efficient handling of the multiplicity of types of used plant. The tendency to regard anything which is second-hand as something to be avoided is rapidly passing, due to the confidence created by the efforts of these organisations, who are capable of seeing a job through to its conclusion.

These firms regularly circularise every trade in the country where types of the plant they handle are likely to be lying redundant. I do not agree with Mr. Crook when he advocates a Government Department to handle the problem. It is unlikely that they would be able to assemble the staffs with the long experience necessary for this work. I think Mr. Crook will find that the war effort is being very considerably helped by firms in the category I have mentioned.

Ealing, W.5. G. H. HOLDING.

Cooker Hotplates

MR. J. ALLEN, in his article on this subject in your issue of February 19th, states that the ideal hotplate should have three attributes:—Quick boiling time, faster than gas; full-range variable heat control; and a guaranteed life of five years.

Hotplates may be divided into two types, the solid plate requiring special utensils, and the radiant plate. The former, in my experience, already has the attributes demanded by Mr. Allen. My cooker has an 8-in. round plate rated at 1,800 W, but actually loaded to 1,960 W on the 240-V supply. It has been in use for nearly five years without a breakdown, and is provided with four-heat (5-position switch) control. I do not know the boiling time for this plate, but I am satisfied that the rating could be reduced with advantage. The electric kettle, particularly with an immersed heater, will always be a faster and more efficient boiler of water. For cooking it is " fatal " to use the full heat of this plate.

I suggest that the rating should not be more than 1,600-1,700 W. This would have the following advantages:—Reduced load on the mains; the full heat could be used without fear of burning food; and the lowest or simmering heat would better meet the requirements.

Mr. Allen complains of the number of types and sizes of hotplates available. I am not interested in the manufacture or distribution of hotplates, but I am certain that this is not the fault of the manufacturer but of the supply authorities who frequently require hotplates (and other things) to their special requirements. The fact that these requirements are individually justifiable is no answer. I think Mr. Allen's suggested Research Committee could usefully be formed to reduce the number of solid plates to two (excluding grill-boilers). The manufacture of " specials " as replacements on existing cookers would, of course, have to continue for a time.

I have no experience of radiant hotplates, but the disadvantage of special utensils would certainly have killed the solid plate if the radiant type were satisfactory. The Research Committee could usefully continue its labours, therefore, to develop a satisfactory radiant plate. I am afraid, however, that the constitution of the Committee, which would have to be based on financial resources provided by the consumer, manufacturer and supply authority, would be more difficult to achieve than a unified command for the United Nations.

Walton-on-Thames. J. EDMUND GAMAGE, A.M.I.E.E.

Supervisors' Luncheon

Recognition of Responsibilities

ABOUT 330 members and guests attended the annual luncheon of the Association of Supervising Electrical Engineers on March 13th. In welcoming the guests, the President, Mr. H. W. Swann, referred by name to many of the prominent men present. Dealing with the question of unqualified men posing as engineers, he said that this was likely to raise important issues after the war.

Responding, Mr. M. S. McCorquodale, M.P. (Parliamentary Secretary, Ministry of Labour), spoke of the work of electrical engineers during the war. He mentioned the immediate discovery, in degaussing, of the antidote to the magnetic mine and referred to radiolocation, submarine location and other radio developments. It was the task of the Ministry, he said, to use labour with full knowledge of the nation's needs, which might not always be what the individual thought best.

The number of applications for engineering cadetships was far in excess of the number of places available and many good men had had to be disappointed; the chief qualities looked for in candidates had been initiative and leadership. There would be great scope for supervisors in post-war building schemes and in helping towards the promotion of export trade on which national well-being in the future would largely depend.

Dr. A. P. Thurston (patent adviser to the Association), proposing the toast of "The Industry," said he had been struck by the greater use of electricity in United States aircraft than in those of the R.A.F., which tended to rely more on hydraulic methods. One great service rendered by the electrical industry, in which £700 million had been invested, was its contribution to the reduction of atmospheric pollution during recent years.

Importance of Domestic Supply

Mr. J. R. Beard (past-president, I.E.E.), in response, contrasted the part played by electricity in the present and last wars. In future the supply to new houses would assume greater importance than the supply to industries. Questions of availability of supply, tariffs and standard voltages were much to the fore and it was very necessary that before the end of the war electricity undertakings should get together and put their house in order, as they were thoroughly conversant with the problems of electricity supply in a way that outsiders could not be. There would be boundless possibilities in post-war telecommunications. In television Great Britain had led the world and he had no doubt would do so again. Standardisation in such matters as electrical fittings, appliances, intake arrangements and sockets required to be considered without loss of time. Codes of practice were in hand in connection with building and the electrical side had been entrusted to the I.E.E. Code of Practice Committee.

Sir Wilfred Garrett (Chief Inspector of Factories), who proposed the toast of "The Association," reminded members that the prevention of electrical accidents was largely in their hands. The increase in the number of these was not anything like proportionate to the increase in the use of electricity. Further good results would follow improvement in the status of supervisors.

Mr. W. H. Brooks (chairman, A.S.E.E.), thanking Sir Wilfred, stated that the Association, as a result of negotiations with employers, had gained recognition in material form of the long hours worked by and increased responsibilities of members in present difficult circumstances and also on account of the increased cost of living. Vocational training was not in itself a complete training; the aim should be to evolve a type of engineer who was a well-informed and eager member of the community and apprenticeship should be the concern of industry as a whole. Mr. Brooks acknowledged (as did other speakers) the services of Mr. A. Brammer, who had been secretary of the Association for twenty-one years.

Domestic Fuel Saving

Comprehensive Series of Memoranda

THE Ministry of Fuel and Power's fuel economy campaign has been considerably assisted by the mild winter. We may now hope that there will be no very severe weather, and this should enable further substantial savings to be made. The need for economy may appear to lessen with the advent of spring but it is necessary to build up stocks of coal in preparation for next winter's demands and so the good work must continue.

All phases of the use of fuel in the home are covered in a series of memoranda issued by the Ministry—coal fires and boilers, oil-burning appliances, gas and electricity. Hints on the care and use of equipment are given and in most instances the actual coal saving which can be effected by economical use is shown.

In the case of the electrical memorandum (No. P.2/5), it is satisfactory to see that while the unnecessary use of lamps is discouraged, there is a warning against reducing lighting to levels injurious to the eyes. For the rest the memorandum follows the lines of the advice already given by the British Electrical Development Association and the Electrical Association for Women. Emphasis is laid upon the necessity for keeping off the 8 a.m. to 1 p.m. peak period.

The proper use of electricity is also given attention in other memoranda dealing with domestic subjects generally, particularly "Domestic Fuels and their Uses" (No. P.2/12); "National and Domestic Fuel Budgets" (No. P.2/13); "Lighting" (No. P.2/7); and "Fuel Economies in Cooking" (No. P.2/9).

Domestic fuel economy was the theme of a broadcast talk by Mr. E. E. Hoadley, chairman of E.D.A., last week. In this he pointed out the peculiar position of E.D.A. which was formed to extend the use of electricity and was now endeavouring to persuade people to use less. He spoke of the efficiency of generation and described simply the methods of carrying electricity to the homes of the nation.

Then he urged the need for continued carefulness in the use of electricity. It was extremely easy to switch on, overlooking the fact that coal was being used whenever a light, a fire or a cooker was switched on. He asked listeners to go to their local electricity supply showroom to obtain advice on the economical use of the service.

COMMERCE and INDUSTRY

Technical Officers Needed. Wages Arbitration.

Urgent Need for Paper

As the amount of paper put into circulation diminishes, although the need for waste paper tends to increase, it is necessary to become progressively more drastic in turning out old documents, books, etc. This, in turn, necessitates the appointment of a responsible person to supervise paper salvage: one who is able to say whether correspondence, accounts, catalogues and other fruitful sources of salvage should be retained or discarded.

Much has already been done in the electrical industry to clear out papers of all kinds, but we are sure that ample scope remains. We impress upon readers once more the real urgency of this matter and ask them not to relax their efforts in this vital cause.

Advice and assistance in the collection and disposal of waste paper are available from the Electrical Industry Waste Paper Recovery Committee, 2, Savoy Hill, W.C.2.

Registration of Engineers

The Ministry of Labour and National Service has announced the registration of men between the ages of 20 and 45 with engineering training with a view to securing technical officers for the forces. Registration will take place between March 22nd and 27th, and the following classes of men will be required to register :—

1.—Men who have completed a general apprenticeship, whether under indentures or otherwise, in mechanical or electrical engineering, not being an apprenticeship confined to one particular engineering craft.

2.—Men who have completed an apprenticeship, confined to a particular engineering craft and who are employed on any kind of mechanical or electrical engineering work and *either* (a) hold an executive position above the rank of foreman; *or* (b) are wholly or mainly engaged in one or more of the following activities: — Draughtsmanship, rate fixing, time and motion study, planning, progressing research, design, testing, plant installation, technical sales.

3.—Men who (a) have passed the graduate membership examinations of the Institutions of Mechanical or Electrical Engineers or who hold a degree, diploma, or other academic qualification exempting them from one of these examinations, or (b) are holders of the Higher National Certificate in mechanical or electrical engineering.

Marine engineers are also included in the registration.

Some time after registration these men will be called up for interview by a selection board which will assess their suitability for commissions—technically and personally—and then, as required, they will be called upon at short notice.

The Ministry states that the necessity may arise for taking technical men from industry for the Forces although this may have an adverse effect upon production ; regard will be paid primarily to the immediate military needs.

Engineering Wages Claim

The claim of the engineering trade unions for increased wages for their members was to be heard by the National Arbitration Tribunal yesterday. The unions asked for an all-round increase of 11s. per week ; an increase equivalent to 33⅓ per cent. in the base rates of plain time workers; and the restoration of the conditions prevailing before June, 1931.

An Inquiry from Colombo

One of our readers in Colombo, Ceylon, informs us that he is interested in the importation of materials for high- and low-voltage lines, transformers, motors, lighting plants, fans and lifts. We will be pleased to send his name to any British manufacturers of this equipment.

Lighting in an Engineering Works

The accompanying illustration shows part of a large works engaged on the manufacture of important war material in which a new electric lighting installation has recently been put into service. There are about 350 points, and "Cosmos" gas-filled lamps are used throughout, together with "Metrovick" dispersive reflectors. The total load is 175 kW and the service illumination obtained in the erection shops and machine shops is 10-12 ft. candles. In both the tool room and the inspection bay

The lighting of erection and machine shops by "Cosmos" gas-filled lamps

the lighting level is increased to 20 ft. candles, while in the storage area the illumination is reduced to 8 ft.-candles. The whole installation, which was planned by the Illuminating Engineering Department of Metropolitan-Vickers Electrical Co., Ltd., is so arranged that local lighting on machines and benches is unnecessary.

Contract Price Adjustment Formulæ

The British Electrical and Allied Manufacturers' Association notifies us of the latest figures for use in its contract price adjustment formulæ. They are as follows:—

(*a*) "Rates of Pay"—the rate of pay for adult male labour at March 13th shall be deemed to be 80s. 6d.; (*b*) "Costs of Material"—the index figure for intermediate products last published by the Board of Trade on March 13th is 170·8 and is the figure for February, 1943.

New Hire-Purchase Order

The Hire-Purchase (Control) Order has now been revoked and replaced by the Hire-Purchase and Credit Sale Agreements (Control) Order (S.R. & O. 1943 No. 321, price 1d., Stationery Office), which comes into force on March 22nd. The new Order is of a more comprehensive character than the one which has been revoked and covers both hire-purchase and credit sale agreements, which are treated under it in exactly the same fashion.

The effect of the new Order is to prohibit a sale, at a price over and above the retail cash price, of all price-controlled goods, new or secondhand, sold through hire-purchase or credit sale agreements, except in the case of certain articles set out in a schedule. These exceptions include a number of articles in respect of which an Order under Section 2 of the Goods and Services (Price Control) Order has not yet been made but will be made as soon as possible after March 22nd. These articles are, therefore, for the time being specifically exempted from the operation of the new Order. Among them are wireless receiving sets of the domestic or portable type; deaf aids; and domestic heating, cooking and cleaning appliances.

Hire-purchase and credit sale agreement charges will also be permitted in the sale of secondhand goods of these descriptions. Such charges will be controlled in a new Secondhand Goods Order which will also come into force on March 22nd.

High-Speed Steel Tools

To assist toolmakers and other users of high-speed steel in complying with the Cutting Tools (No. 2) Order, covering the production of high-speed steel tools by butt welding, etc., a list of standard blanks has been drawn up by the Machine Tool Control and will shortly be the subject of a British Standard Specification. The accumulated experience of the steel makers and tool manufacturers has been pooled in compiling this list.

The standard blanks, consisting of a suitable length of high-speed steel butt-welded to a medium carbon steel shank, will be kept in stock and will be supplied in the fully annealed condition ready for machining. They will be suitable for the manufacture of twist drills, reamers, end mills, slot drills, "T" slot cutters, and machine taps, and square sections will be available for lathe and planer tools.

The Controller of Jigs, Tools and Gauges has exempted the following tools from the provision of the Order: Jobbers' drills; straight shank end mills; taper pin reamers; straight shank slot drills; and woodruff cutters. All these in the sizes prescribed in the B.S.S. may be made in solid high-speed steel, if application is made to the Machine Tool Control, 35, Old Queen Street, S.W.1, for an exemption licence.

Long-term exemption licences are also being granted by the Machine Tool Control to cover the manufacture from solid high-speed steel of taps up to 1¼ in. diameter, where the cutting portion exceeds 40 per cent. of the total length, and the overall length is not more than 7½ times the diameter.

The provisions of the Order apply to tools produced from all types of high-speed steel, including the new tungsten-molybdenum high-speed steel.

Applications for exemption licences must clearly state the type, diameters and lengths, as well as the numbers required.

Fatality

An inquest was held at Carlisle recently on Thomas McCreesh (34), fitter's mate, who received a fatal electric shock at the Corporation Electricity Department when removing a lighted lamp from a holder at the end of an insulated cable. It was stated that deceased was employed by the Stirling Boiler Co., Ltd. The coroner's verdict was that death was due to electrocution through accidentally touching a live wire. He said that there was little doubt how the accident occurred; he thought deceased got his thumb into the socket and was unable to take it out.

TRADE MARK APPLICATIONS

THE following application has been made for a British trade mark. Objections may be entered within a month of March 10th:

ASEA. No. 620,609. Class 7. Machinery for generating electricity, machinery operated by electricity or by steam, electrically operated machine tools, electromotors (not for land vehicles), machine couplings, gears and gearings (not for land vehicle propulsion systems); and parts (not included in other classes) of all the said goods—Asea Electric, Ltd., Fulbourne Road, Walthamstow, London, E.17. To be associated with No. 348,553 (1832) vi and others.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

DURAMEG air-drying insulating varnish.

Cerac, Ltd., present address.

Transmission Section Luncheon

ALTHOUGH social activities must necessarily be restricted in wartime, the support accorded the informal luncheon held by the Transmission Section of the Institution of Electrical Engineers last year prompted the Section Committee to repeat the "venture" this session. Precisely the same number of members and guests assembled at the Connaught Rooms last week under the chairmanship of Mr. P. E. Rycroft who, after the loyal toast, called on the President to address the gathering.

Professor C. L. Fortescue remarked that the I.E.E. was a large organisation and circumstances of war had proved the wisdom of its devolution policy, but how its numerous activities should be apportioned might become a problem. There might be some difficulty in distinguishing the tail from the dog. If a shortage of technical papers should be experienced, the traditional "ordinary" meetings would have to be preserved; in which event the function of the Sections would be to discuss more intimately and informally their own immediate activities.

Mr. P. E. Rycroft, in thanking the President, assured him that his "proposal for limiting section activities" would receive due consideration. The Transmission Section had no doubt about its task, which was to transmit the benefits of electricity as far and as widely as possible. All they needed was a modicum of freedom from mediocracy, from unnecessary restriction, and freedom of purchase, to enable them to complete their task.

Mr. S. W. Melsom, immediate past-chairman, proposed the health of the chairman and of the chairmen of the three other Technical Sections, on whose behalf Dr. R. L. Smith-Rose (chairman, Wireless Section) responded.

Industrial Fuel Economy

THE industrial fuel efficiency campaign is being extended by the Fuel Efficiency Committee by promoting an exchange of ideas between different industries. A preliminary series of three meetings is being held to see how far methods used in one industry can be adapted for use in another. At the second meeting held in London recently, leading experts were present from nine different industries, all of which had in common the use of high temperatures in their processes. Among those represented were the iron and steel, ironfounding, nickel, glass, pottery, refractories, cement and lime industries.

Synthetic Rubber Production

MR. Donald Nelson, chairman of the United States War Production Board, has stated that it was decided in February that the initial phase of the synthetic rubber production programme must be completed by July. It is intended to have plants in operation by this time capable of producing 435,000 tons a year of "Buna S," equivalent to 55 per cent. of the "target" fixed by the Baruch report. With this plant in operation needs for further production will be balanced with the demand for other vital war materials.

In the Courts

Transformer Erector's Claim

AN important point concerning "statutory obligation" was raised at the Leeds Assizes last week in an action for damages before Mr. Justice Croom-Johnson, in which the plaintiff was Wilson Oldroyd (29), of Thornhill, Dewsbury, and the defendants the Yorkshire Electric Transformer Co., Ltd., Dewsbury, who had employed Oldroyd as a transformer erector and fitter.

For the plaintiff it was stated that while he was engaged on repair work to an electricity switchboard on defendants' premises his head came in contact with a live terminal, and he received a charge of 6,600 V. He was unconscious for nine days and was in hospital for nine weeks, his scalp having been destroyed to the bone and the vault of the skull severely burned. It was doubtful whether he would be able to work again. It was alleged that defendants had been negligent in failing to make the switchboard "dead" before plaintiff began work at it, and that they failed to provide proper fencing.

On behalf of the defendants it was contended that the accident was caused or contributed to by plaintiff's own negligence and breach of statutory duty in failing to take proper precautions for his own safety.

In awarding plaintiff £3,762 damages (including £262 special damages) and costs, his Lordship said he found that Oldroyd, on the simple facts of the case, had established a good action in common law of failure by his employers to do their duty to him. The statutory regulations laid it down as the duty of workmen to conduct their work in accordance with those regulations. Counsel for defendants had interested him by an argument that if the cause of the action here was the breach of statutory obligation, the employers were entitled to say, as a matter of law, that the workman was as much responsible for the accident because he had committed a breach of the statutory obligation by working on a switchboard which had not been made "dead."

He preferred to say no more on that point, except that he had indicated it, so that it should be made plain, if the case went further, that the point was taken and argued. But in the view he had formed, the plaintiff was not obliged to rely on a breach of statutory obligation at all. He had established a good claim at common law. He thought therefore that it was undesirable that he should take up time by considering the fascinating legal problem whether counsel's contention on that point was well founded or not.

Stay of execution for 14 days was granted as to £3,250 of the damages.

Apprentice's Injuries

At Manchester Assizes last week, Leonard Charles Barber (17), an apprentice engineer, was awarded £450 damages against the Metropolitan-Vickers Electrical Co., Ltd., in a claim for injuries. It was stated that plaintiff was working near two wires thought to be "dead" when he touched an unprotected electric fuse. His right hand was badly burned and the middle finger had to be amputated.

E.D.A. Provincial Areas

Meetings at Manchester and Leeds

THERE were numerous distinguished members of the electricity supply industry and guests at the fourteenth annual luncheon, followed by the annual general meeting, of the North-West England and North Wales Area of the British Electrical Development Association at the Engineers' Club, Manchester, on March 11th. The proceedings were presided over by the retiring chairman, Mr. J. Harwood Lumsden (Stalybridge, Hyde, Mossley and Dukinfield Transport and Electricity Board), until the election of his successor, Mr. J. E. Shepherd (Barrow-in-Furness Corporation).

Admiral G. P. Thomson (Chief Press Censor) proposed the toast of the Association and centred most of his remarks on the U-boat menace, and the highly important part played by electricity in operating submarines. Speaking as a naval officer, he said that no section of the community owed more to electrical development than the Royal Navy. The submarine owed its conception to electricity, for without it it would be useless. But the electrical world was hardly to be congratulated on methods of electrical storage. The lead battery was heavy and cumbersome in relation to storage and output.

Women's Interest

Mr. E. E. Hoadley (chairman of E.D.A. Council) replied, and commented that E.D.A. had nothing to be ashamed of in its support of the Fuel Economy Campaign, having helped the country to weather a serious situation. One important result had been that the public and electricity authorities had been brought into more intimate relationship. There would be a different clientele for suppliers after the war; most pre-war customers were men, but from the point of view of future domestic electrical requisites, the young women's interest would have to be cultivated, for during their war service they had learned much of the applications of electricity. Thus E.D.A. had great work to do in the future in the development of their industry.

The chairman, Mr. J. Harwood Lumsden, proposed "The Guests." He considered that the results of the fuel campaign had fully justified the faith that the supply authorities had in their customers, but he asked that the public Press should emphasise the troubles of the "morning peak." The war had increased the attention paid to commercial cooking apparatus, and he suggested that one of E.D.A.'s coming moves should be vigorous attention to the opening of works canteens, British restaurants, school canteens, etc., for which electricity was efficient, economical and clean. Undertakings should attend to the servicing of such apparatus.

The North-West England and North Wales Area Committee had put forward to the Council in London a number of ideas for post-war planning. Simpler service apparatus and metering were necessary—a clean job instead of a conglomeration of wires, cut-outs and meters spread over several square yards of wall. Again, E.D.A. should consult with architects to have electrical equipment installed during building, not added as an afterthought. A textbook for senior scholars was proposed, for education in the use of cookers, heaters, irons, etc. Street lighting ought to be better than before the war, or there would be a public outcry. Mr. Hartley W. Shawcross, K.C., responded.

Annual Meeting

At the annual general meeting which followed the luncheon Mr. J. E. Shepherd, borough electrical engineer, Barrow-in-Furness, was elected chairman for the next twelve months in succession to Mr. Lumsden, with Mr. R. H. Harral, engineer and manager of the Blackburn Electricity Department, as deputy chairman.

Generous reference was made to the retiring chairman's work during the past year. The pending retirement of Mr. A. C. Cramb from the post of director of the Association prompted many tributes to his good work.

The annual report recorded that the Area membership was 76. The Senior Staffs' Committee had held nine meetings and four conferences to discuss topics of value to sales staffs. Demonstrators' meetings had been held and a monthly recipe service had been inaugurated. Fuel economy exhibitions had been held in many parts of the Area.

Mid-East England Area

At the annual conference of the Association's Mid-East England Area at Leeds on March 10th, Mr. E. E. Hoadley, referring to post-war activities in the electrical industry, expressed the view that if sections of the industry could not get together and produce the outline of a scheme, then they would have a scheme thrust upon them. The electrical industry would have to decide whether electricity supply should continue to provide dividends, bonuses and bonus shares for shareholders, or be administered as a public service.

Mr. A. East also urged the drawing up of a post-war plan for the industry. The Mayor of Leeds (Miss J. B. Kitson) considered that electricity should be extended further into country areas. She did not know why country people should be denied electrical facilities available to town-dwellers.

Farming in France

A MEETING has been arranged by the Union des Ingénieurs et Techniciens de la France Combattante at 5 p.m. on March 25th, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, S.W.1. Monsieur André Philip (Commissaire National à l'Intérieur et au Travail) will preside and Lieut. R. Drilhon will read a paper on the future of farming in France with reference to reorganisation on a rational basis, to be followed by a general discussion. British and allied engineers are cordially invited to attend the meeting and to take part in the discussion either in English or French. A summary of the paper in English will be available.

Argentine Imports

Reorientation of Trade

UNLIKE most other countries (neutral and belligerent) Argentina has not ceased publication of its annual statement of foreign trade, with countries of origin and destination, and that for 1941 has just been issued. From it have been extracted the following figures of the principal electrical imports in that year, showing the chief countries of origin, with notes of increases or decreases compared with 1940. The values given are those adopted by the Argentine Customs. Later they will be based on invoice values, as the Argentine Statistical Department introduced this change in July, 1941.

Between 1940 and 1941 there was a decline of about 20 per cent. in the total tariff value of the imports of electrical materials (not including machinery) into Argentina. In motors and dynamos the percentage decrease was higher. In the three years German trade with Argentina in such goods fell in value from 4,178,000 pesos to 246,000 pesos; Belgian from 2,159,000 to 101,000; Danish, 233,000 to nil; French 297,000 to 1,500; Hungarian from 440,000 to 140; Italian from 461,000 to 23,000; Dutch from 2,485,000 to 10,000; and British from 2,812,000 to 2,382,000; while on the other hand, during the same period United States trade increased from 6,573,000 to 9,826,000 pesos, Brazilian from 5,000 to 248,000, Canadian from 131,000 to 448,000, Japanese from 165,000 to 224,000, Swedish from 616,000 to 921,000 and Swiss from 909,000 to 932,000 pesos.

Argentina is building up an export trade in radio material, electric lamps, accumulators and other smaller apparatus with neighbouring countries. In 1941 her total exports of radio goods were valued at 4,150,000 pesos, more than twice the 1940 figure; those of lamps were 405,000 pesos; accumulators, 72,000 pesos; and unspecified electrical goods 685,000 pesos, an increase of over 50 per cent. on 1941. Brazil, Chile, Peru and Uruguay were the leading markets.

Description of Goods	1941 Pesos (000)	Inc./dec. on 1940 Pesos (000)
Fan motors—		
Total	67	− 169
From United States	40	− 79
„ United Kingdom	26	− 28
Motors up to ¼ HP—		
Total	100	− 178
From United States	78	− 88
„ United Kingdom	21	− 85
Motors and dynamos over ¼ HP—		
Total	1,513	− 296
From Germany	15	− 68
„ Brazil	50	+ 50
„ United States	351	− 53
„ United Kingdom	525	− 85
„ Italy	4	− 128
„ Sweden	468	+ 129
„ Switzerland	97	− 44
Cable and wire up to 5 mm. covered with cotton, rubber, etc.—		
Total	640	− 430
From United States	399	+ 46
„ United Kingdom	233	− 394
Cable and wire over 5 mm. covered with cotton, rubber, etc.—		
Total	277	− 177
From United States	15	− 18
„ United Kingdom	262	− 146
Cable and wire up to 5 mm. lead-covered—		
Total	305	+ 147
From Canada	223	+ 223
„ United Kingdom	50	− 67
„ Sweden	31	+ 1
Cable and wire over 5 mm. lead-covered—		
Total	820	−1,252
From Brazil	11	+ 11
„ Canada	170	+ 170
„ United States	63	+ 36
„ United Kingdom	565	−1,131
„ Sweden	11	− 29
Electrical flex—		
Total	235	− 110
From Canada	46	+ 24
„ United States	51	− 4
„ United Kingdom	133	− 87
Telephone cables of iron or steel—		
Total (all from United States)	872	+ 412
Telephone cable, underground—		
Total	3,180	− 2
From United States	628	+ 424
„ United Kingdom	2,369	+ 709
„ Sweden	77	− 60
„ Brazil	104	+ 86
Cable and wire, silk-covered—		
Total	100	+ 69
From Belgium	13	+ 13
„ United States	85	+ 58
Wire, electrical, enamelled—		
Total	331	− 36
From Canada	33	− 23
„ United States	181	+ 38
„ United Kingdom	105	− 42
„ Sweden	12	+ 6
Accessories for underground cables—		
Total	78	+ 42
From United Kingdom	55	+ 29
„ United States	19	+ 19
Radio-telephone apparatus—		
Total	134	− 83
From United Kingdom	41	− 32
„ United States	77	+ 18
„ Switzerland	6	+ 6
Radio-telephone receivers—		
Total	2,428	− 96
From United States	2,375	+ 367
„ United Kingdom	50	+ 33
Radio-telephone amplifiers—		
Total	143	− 31
From United States	135	− 16
„ United Kingdom	6	− 2
Loudspeakers (metal)—		
Total	169	− 272
From United States	166	− 212
„ United Kingdom	4	− 2
Radio-telephone parts—		
Total	2,274	− 740
From United States	2,007	− 233
„ Italy	23	− 19
„ United Kingdom	220	+ 72
Telephones, magneto—		
Total	134	+ 53
From Sweden	41	+ 37

(*Continued on next page*)

Argentine Imports (*Continued from preceding page*)

Description of Goods	1941 Pesos (000)	Inc./dec. on 1940 Pesos (000)
Telephones without coils—		
Total	45	+ 3
From Canada	5	+ 1
„ United States	1	+ 1
„ United Kingdom	3	+ 1
„ Sweden	25	+ 12
Telephones with coils—		
Total	213	— 224
From Japan	17	+ 15
„ Sweden	72	+ 31
Telephone material—		
Total	773	+ 307
From Belgium	75	— 70
„ United States	444	+ 311
„ United Kingdom	228	+ 73
„ Sweden	10	+ 8
Telegraph material—		
Total	58	— 29
From United States	28	+ 10
„ United Kingdom	31	— 38
Heaters, toasters, kettles, etc.—		
Total	15	— 47
From United States	8	— 7
„ United Kingdom	2	— 31
Switches, circuit-breakers, cut-outs, fuses, etc.—		
Total	438	— 350
From Brazil	93	+ 93
„ United States	189	— 145
„ Japan	7	+ 7
„ United Kingdom	82	+ 5
„ Switzerland	21	+ 14
Vacuum cleaners—		
Total	170	— 11
From United States	1	—
„ Sweden	166	+ 53
Electric bells—		
Total	22	— 51
From Belgium	10	+ 6
„ United States	8	+ 1
„ United Kingdom	2	— 3
Insulating tape—		
Total	62	— 44
From United States	29	— 28
„ United Kingdom	31	— 18
Change-over switches—		
Total	628	— 269
From Belgium	11	— 43
„ United States	36	+ 29
„ United Kingdom	456	— 275
„ Sweden	120	+ 81
Electric incandescent lamps—		
Total	737	— 807
From Brazil	33	— 184
„ United States	145	+ 110
„ Japan	187	+ 25
„ United Kingdom	296	+ 8
„ Sweden	41	+ 11
Electric torches—		
Total	92	— 235
From China	25	+ 5
„ United States	36	— 19
„ Japan	7	— 23
Meters—		
Total	1,491	— 734
From Canada	153	— 218
„ United States	96	+ 27
„ United Kingdom	65	+ 10
„ Sweden	315	+ 239
„ Switzerland	767	— 142
Ammeters and voltmeters—		
Total	68	— 4
From United States	53	+ 3
„ United Kingdom	11	— 2
Distribution boards—		
Total	227	+ 155
From United States	49	+ 29
„ United Kingdom	159	+ 121
„ Sweden	12	+ 7
Batteries—		
Total	62	— 76
From United States	20	— 37
„ United Kingdom	42	— 32
Accumulator and battery parts—		
Total	1,282	— 98
From Canada	280	+ 55
„ United States	875	— 99
„ United Kingdom	77	— 55
Glass bulbs for lamp and valve manufacture—		
Total	576	+ 119
From Brazil	110	+ 57
„ United States	466	+ 320
Electrical materials, unspecified—		
Total	3,066	+ 42
From Brazil	8	+ 2
„ Canada	6	—
„ United States	2,337	+ 864
„ United Kingdom	533	— 140
„ Switzerland	118	+ 14

Imports of Ecuador

Downward Trend in 1941

BUSINESS conditions in Ecuador are described by the Bank of London and South America as good in relation to the present abnormal situation and the supply of foreign exchange is said to be much in excess of demand. Shipping space is being allocated for the export of cocoa, arrivals of which from producing centres are satisfactory. The coffee market has been active at firm prices. The United States is expected to take the whole of the kapok crop, while Venezuela, Cuba and Peru have been showing interest in rice. Washington has fixed a maximum price for balsa wood.

In the electrical import trade in 1941 there was a decrease. It was substantial in most lines, the only noteworthy increases being in transformers, refrigerators and telephone material. The following table gives the values of the imports of the principal groups with notes of increases or decreases compared with 1940. Most of the trade was done by the United States. (About 75 sucres=£1.)

Description of Goods	1941 Sucres (000)	Inc./dec. on 1940 Sucres (000)
Transformers	240	+ 97
Motor-generators and dynamos not over 3 HP	330	— 18
Refrigerators	495	+ 85
Telephones and accessories	97	+ 45
Telegraph instruments and accessories	36	+ 29
Fans and parts	27	— 36
Radio transmitting equipment	255	— 1,650
Storage batteries	270	— 60
Storage-battery parts	1	—
Dry batteries and parts	256	+ 106
Flashlights	52	— 90
Incandescent lamps, large	360	— 350
Incandescent lamps, miniature	45	+ 15
Insulators	60	— 30
Insulated wire and cable	315	— 435
Welding apparatus	11	— 79
Ranges and ovens	37	+ 9
Small electrical appliances	157	— 28
Elec. accessories and wiring devices	262	— 248

ELECTRICITY SUPPLY

Contributions to Rates.

Barrow-in-Furness.—SUBSTATION EQUIPMENT.—Sanction has been obtained by the Electricity Committee to borrow £4,000 for substation equipment.

Chapel-en-le-Frith. — ELECTRICAL INSTALLATION.—The Rural District Council proposes to have electric lighting installed at Eaves Hall.

Lanarkshire.—AMALGAMATION OF LIGHTING DISTRICTS.—The county lighting engineer reported that considerable economies would be effected by the proposed amalgamation of the present 53 lighting districts into one special lighting district. It would also assist in the provision of greatly improved lighting in those districts, which, owing to lack of rateable valuation, could not afford the standard of lighting demanded by modern traffic conditions. The scheme was approved at a special meeting of the County Council.

Lichfield.—PRICE INCREASE WAIVED.—The Electricity Committee has decided that the increase of 10 per cent. adopted in 1940 shall not be charged in respect of the quarter ending March 31st, and that the price for lighting in the rural area shall be reduced to 5d. per kWh.

RATE RELIEF.—A sum of £500 has been allocated to the rates by the Electricity Committee from the profits of the undertaking.

London.—POPLAR.—The Borough Council Electricity Committee is to divert a feeder in Douro Street at a cost of £600, improve distribution in the Isle of Dogs (£900), and provide additional supply to the London graving dock (£1,000).

Motherwell.—LIGHTING WARDENS' POSTS.—Subject to confirmation by the Ministry of Home Security the A.R.P. Committee has approved the installation of electric lighting in wardens' posts at an initial cost of £306.

Swindon.—LOAN SANCTIONED.—The Electricity Committee has obtained sanction to borrow £1,856 for mains and services and £1,466 for plant.

Warrington. — RATE CONTRIBUTION. — The maximum permissible sum (1¼ per cent. of the outstanding debt of the undertaking) is being contributed by the Electricity Committee for the relief of the rates.

Watford.—PRICE OF FUEL.—Grave concern is expressed by the Electricity Committee at the increase in the cost of coal used by the undertaking during the last five or six years and the Committee suggests asking the Ministry of Fuel and Power for details of the basis on which such increases have been made.

Lanark Lighting Plan.

that the undertaking should give £5,000 was adopted. Councillor Sword, who urged that the figure should be £15,000, said that £5,000 was too low. The undertaking, he said, should be considered as a private company paying something for the use of the roads.

Sweden.—FURTHER RAILWAY ELECTRIFICATION.—A report submitted to the Government by the Railway Board recommends that the next lines to be electrified should be those from Varberg to Uddevalla (136 miles) and from Ostersund to Storlien (101 miles), the total cost of which would be 28 million kr. and 17·9 million kr., respectively. It is intended to begin work on the Uddevalla—Vänersborg—Herrljunga section, estimated to be completed for electric running at the end of 1944, and the Ostersund—Järpen section, to be completed in the first half of 1945. At present the electrified lines of the State Railway cover a distance of 2,651 miles; the figure for the private railways is about 375 miles.—*Reuter's Trade Service.*

TRANSPORT

Dundee. — TROLLEY-BUSES. — The Transport Committee has agreed to purchase ten new double-deck buses this year and nine next year.

Newcastle-on-Tyne.—RATE RELIEF REDUCED.—At a meeting of the City Council a suggestion that the transport undertaking should contribute £15,000 to the general rates was rejected, and a recommendation by the Advisory Committee

RADIO & TELEPHONY

Chesterfield.—POLICE RADIO.—At a recent meeting of the Watch Committee the town clerk submitted a letter from the Home Office intimating that before final approval could be given to the modified scheme for the establishment of a short-wave wireless system it would be necessary for certain tests to be carried out in the borough. These tests would be made within the next few months, but there was little likelihood of the necessary apparatus being supplied during the next twelve months.

Rumania.—TELEPHONE STATISTICS.—According to the *Journal des Télécommunications* the number of subscribers to the system of the Rumanian Telephone Co. at the end of 1941 was 94,880, equal to 7·14 per 1,000 inhabitants. (This compares with 153 per 1,000 inhabitants in Sweden, the leading European country as regards telephone density.) A feature of the Rumanian system is the high proportion of automatically-operated lines, no fewer than 75,532 being automatic and only 19,348 manually worked. The extensions in the field of international telephone communication during 1941 included a line between Bucharest and Kronstadt and one between Ploesti and Baku.

The Modern Power Station

THE remaining three Cantor Lectures in the series on "The Modern Power Station" are to be held at the Institution of Electrical Engineers instead of at the Royal Society of Arts. The lectures are on Mondays at 1.45 p.m., and the subjects are as follows: March 22nd, "Coal and Ash Handling Plant," by Mr. J. F. Roy Mitchell, director of Mitchell Engineering, Ltd. March 29th, "The Mechanical Equipment of the Turbine House," by Mr. F. Shakeshaft, power station development engineer, C.E.B. April 5th, "High Voltage Power Circuit Control," by Mr. C. W. Marshall, technical and research engineer, C.E.B.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Automatic Telephone & Electric Co., Ltd., in a preliminary statement, shows profits for 1942 of £261,888, an increase of £14,105 as compared with 1941. Directors' fees require £2,722, depreciation £55,347 and capital premiums, War Damage Act, £12,814. Transfer towards income tax on 1942 profits is £125,363. It is proposed to pay a final ordinary dividend of 7 per cent. and a cash bonus of 2½ per cent., again making 12½ per cent. for the year. The dividend on the deferred shares is 10 per cent., plus a cash bonus of 2½ per cent., maintaining the distribution at 12½ per cent. All these dividends are less tax. The balance carried forward is £138,669 (against £146,221 brought in).

British Insulated Cables, Ltd., reports a profit for 1942 of £831,107, as compared with £810,385 for the preceding year. From this the following allocations have been made:—Depreciation, £247,324; war contingencies reserve, £100,000; and provident fund for workpeople, £50,000. The final ordinary dividend is 10 per cent., plus a bonus of 5 per cent., maintaining the distribution for the year at 20 per cent., less tax. The balance carried forward is £428,227 (against £478,547 brought in).

Enfield Cable Works, Ltd., is paying a final ordinary dividend of 6¼ per cent., again making 12½ per cent. for the year. The net profit is £166,623. In respect of the previous accounting period the net balance was £117,039, after provision for taxation, depreciation, etc., totalling £144,785.

The British Thomson-Houston Co., Ltd., reports profits for 1942, after meeting taxation, of £562,883, against £559,776 for 1941. Depreciation requires £224,950 and general reserve again receives £100,000. The ordinary dividend for the year is maintained at 7 per cent., less tax, and the balance carried forward is £254,171 (against £217,413 brought in).

London Passenger Transport Board.—From the Board's annual report for 1942, published last week, it is possible to amplify the revenue figures given in our issue of February 26th. Out of the revenue for the year a sum of £750,000 has been set aside as provision against wartime liabilities, since the Board will be required to bear, outside the Government control accounts, exceptional charges arising out of the war. With regard to the first cumulo valuation of the Board's railway, tramway and trolley-bus undertakings for rating purposes for the years 1936-41, the reduction to £945,270 from the original £1,594,000 has released certain appropriations and has also enabled the Board to recover part of rates paid on assessments hitherto in force. The sum to be retained by the Board in respect of the period up to the end of June, 1939, is estimated at £755,000 and this has been credited to the 1942 revenue account. Sums set aside after that date revert to the credit of accounts prepared in conformity with the Railway Control Agreement. It is stated that a valuation of £850,000 has been mutually accepted for the draft valuation roll for the second quinquennium (1941-46). Referring to the redemption of the 4½ per cent. T.F.A. stock at the beginning of the year, the report records that the holders of £9,863,948 accepted the offer to convert to the new 3 per cent. guaranteed stock, and the remaining £2,719,052 was repaid in cash at par.

International Combustion, Ltd., reports a rise in profit from £197,769 in 1940-41 to £222,553 last year. The allocation to reserve for taxation is raised from £132,255 to £142,225 and a special provision of £20,000 is made for undue wear and tear. The ordinary distribution is maintained at 30 per cent. by a final dividend of 15 per cent. with a bonus of 10 per cent. The company's plant is stated to be operating to its fullest capacity and the orders in hand are satisfactory.

The Allmänna Svenska Elektriska Aktiebolaget (A.S.E.A.) (Sweden) announces a practically unchanged profit of 9,000,000 kr. (£582,400) for 1942, after putting aside 12,800,000 kr. for taxes and depreciation. Owing to the limitation of company dividends recently introduced in Sweden as an anti-inflation measure, the company has had to reduce its dividend from 10 to 9 per cent. As, however, it increased its share capital last year from 75,000,000 to 90,000,000 kr. by issuing bonus shares, the dividend payment will this year require 8,100,000 kr. as against 7,500,000 kr. for the preceding year. The directors further recommend that an unchanged amount of 1,000,000 kr. shall be transferred to a special building fund and that nearly 7,000,000 kr. shall be carried forward.

The Cape Electric Tramways, Ltd., reports a profit of £44,075 for 1941-42, as compared with £34,146 for the preceding year. To this are added £50,028 brought forward and a refund of £5,536 in respect of E.P.T. After transferring £10,000 to replacements reserve, the dividend is raised from 5 to 6 per cent. and £60,166 is carried forward. A substantial advance, from 68 to 82 million, is recorded in the number of passengers carried in Capetown and Port Elizabeth with a corresponding rise in gross receipts.

North-Eastern Electric Supply Co., Ltd.—The directors' report for the past year mentions that the outstanding balance (£2,202,039) of the 5 per cent. consolidated debenture stock was redeemed during the year. The final dividend on the ordinary stock, as already reported, is 4½ per cent., making 7 per cent. for the year.

Switchgear & Cowans, Ltd., are paying a dividend of 20 per cent. for 1942. This compares with 10 per cent. for the previous year, to which rate it was lowered from 15 per cent. for 1940.

The Midland Electric Corporation for Power Distribution, Ltd., is again paying a final ordinary dividend of 6 per cent., maintaining the distribution for the year at 9 per cent.

Associated Electrical Industries, Ltd., is maintaining its ordinary dividend for 1942 at 10 per cent., less tax.

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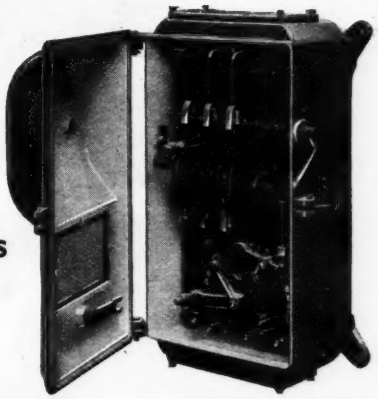

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The Woking Electric Supply Co., Ltd., has announced a final ordinary dividend of 4½ per cent., making 7½ per cent., free of tax, for the year (unchanged).

The Lancashire United Transport & Power Co., Ltd., has announced a final dividend of 6 per cent. making 10 per cent. for the year (unchanged).

The Clyde Valley Electrical Power Co., is paying a final ordinary dividend of 5 per cent., making 8 per cent. for 1942 (same).

The Metropolitan Electric Supply Co., Ltd., is maintaining its ordinary dividend for 1942 at 8 per cent., by a final payment of 5 per cent.

Ericsson Telephones, Ltd., is again paying a final dividend of 12 per cent., with a bonus of 3 per cent., making 20 per cent. for the year, all free of tax.

Crabtree Electrical Industries, Ltd., is maintaining its interim dividend at 5 per cent.

Ensign Lamps, Ltd., is paying an interim dividend of 10 per cent. (same).

The Electrolytic Zinc Co., of Australasia, is again paying an interim dividend of 4 per cent.

New Companies

Burgess Mouldings, Ltd.—Private company. Registered March 6th. Capital, £5,000. Objects: To carry on the business of moulders and manufacturers of, and workers in, bakelite, vulcanite and plastic and other materials, manufacturers of, and dealers in, electrical equipment, etc. Directors: E. J. L. Cotton, Beechrome, Earl Shilton, Leics, and W. Riddell, Sketchley Hall Farm, Hinckley, Leics. Solicitor: T. Flavell, Hinckley.

Godfrey Industries, Ltd.—Private company. Registered March 8th. Capital, £100. Objects: To carry on the business of manufacturers and rewinders of electrical and radio windings; consulting wireless experts, designers, manufacturers, factors and repairers of electrical, radio and telephone apparatus and supplies, etc. F. Godfrey, Bonair, Brundall, Norfolk, is a permanent director.

Bresan, Ltd.—Private company. Registered March 2nd. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, batteries, cells, metals, glass, erinoid, celluloid and alloys, etc. Subscribers: R. I. W. Freedman, 21, Fraser Road, Crumpsall, Manchester, 8, and Miss E. Langham, 16, Chardmore Road, N.16. Solicitors: Gale & Phelps, 220, Stamford Hill, N.16.

Filred Radio & Television, Ltd.—Private company. Registered March 2nd. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, radio and television sets and accessories, electrical engineers, etc. Directors: F. Hamer, 3, Arden Road, N.3, and P. Goldman, 18, East End Road, N.3. Registered office: 39, Cheapside, E.C.2.

Robert North & Sons, Ltd.—Private company. Registered March 9th. Capital, £2,000. Objects: To carry on the business of manufacturers of, and dealers in, electrical, scientific, horological, optical and other instruments, etc. Directors: R. B. North, and Lorna C. North, both of Pilgrim's Well, Little Bushey Lane, Bushey Heath. Registered office: 18, Rudolph Road, Bushey, Herts.

N. E. (Sales), Ltd.—Private company. Registered March 9th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, sound reproducing machines, electrical and wireless accessories, etc. Directors: F. J. Brignall, 263, Grovehill Road, Beverley, and E. P. Sharp, Field House, Church Lane, Kirk Ella. Secretary: T. G Burton. Registered office: National Provincial Chambers, Silver Street, Hull.

Companies' Returns

Statements of Capital

Horley & District Electricity Supply, Ltd.—Capital, £200,000 in £1 shares. Return dated March 31st (filed October 23rd). All shares taken up. £108,320 paid (£1 on 18,640 shares and 10s. on 179,360 shares). £2,000 considered as paid on 2,000 shares. Mortgages and charges: Nil.

Telephone Manufacturing Co., Ltd.—Capital, £500,000 in 2,000,000 ordinary shares of 5s. Return dated July 27th (filed November 19th). 1,540,000 shares taken up. £201,562 10s. paid (6s. 9d. on 200,000, 7s. 6d. on 240,000 and 8s. 9½d. on 100,000 shares). £250,000 considered as paid on 1,000,000 shares. Mortgages and charges: Nil.

Adamson, Green & Co., Ltd.—Capital, £5,000 in £1 shares. Return dated September 25th. 900 shares taken up. £900 paid. Mortgages and charges: Nil.

Increases of Capital

Swansea Auto-Electrical Engineers, Ltd.—The nominal capital has been increased by the addition of £4,000 in £1 ordinary shares beyond the registered capital of £1,000.

Santon, Ltd.—The nominal capital has been increased by the addition of £2,000 in £1 ordinary shares beyond the registered capital of £28,000.

Reduction of Capital

Whitehall Electric Investments, Ltd.—In the High Court on March 15th, Mr. Justice Bennett sanctioned the reduction of the company's capital from £7,500,000 to £6,250,000 by the return of 10s. per share to the preference stockholders. Counsel for the company stated that it had cash in excess of requirements. After the reduction the company would have ample resources with which to carry on its business.

Mortgages and Charges

Presco Electrical, Ltd.—Satisfaction in full on February 11th, 1943, of debenture dated July 28th, 1942, and registered August 17th, 1942.

Receiver Released

Notley Power Units, Ltd.—C. R. H. Howell, of 8, Staple Inn, W.C.1, ceased to act as receiver on February 24th, 1943.

Bankruptcies

A. R. Carter, electrical contractor, 2, Priory Avenue, Mile End, Bridgend.—Application for discharge to be heard on April 21st at the County Court, Bridgend.

STOCKS AND SHARES

TUESDAY EVENING.

NOW that the London "Wings for Victory" week is over, Stock Exchange markets are able to resume a more normal condition. At the present moment, the Bank of England is paying out something like £15,000,000 in respect of the various Indian railway stocks requisitioned by the Treasury, and while the greater part of the money is no doubt being directed into national war loans, a certain amount of it will reach the Stock Exchange markets. As an influence on the other side of the slate, forecasts of the Budget are being made and, at no time serving as bull points for Stock Exchange prices, they have a slightly depressing tendency in spite of the abundance of money which requires investment.

The J.E.A. Plan

The market in the ordinary shares of Home electricity supply companies has taken on a more settled appearance now that the first shock of unpleasant surprise created by the London and Home Counties J.E.A. action has worn off. Reference was made here last week to the unfavourable effect which the announcement of the Authority's plan had exerted upon prices of such shares as those of the County of London, Northmet, Metropolitan and a few others closely connected with the London group. Financial writers were disposed to treat the matter as though it held no serious concern for the holder of ordinary shares in the London companies, and as if there were no likelihood of the plan being put into execution. Whether the plan itself is just or unjust, this is not the place to discuss, but possibly the financial interests which are connected with the ordinary stocks and shares of the companies have failed to give sufficient weight to the proposals put forward. It is recognised by the more liberally minded in the Stock Exchange that the proposal itself follows fairly closely upon the modern trend for nationalisation, or, as some prefer to call it, regionalisation.

The Investor's Conviction

The time may come when the supply of electricity is regarded as being in the nature of a national service. To debate this, however, is to adventure into the realms of theorising best left unexplored by the humdrum commentator upon Stock Exchange market affairs. The fact remains that a good many people have bought electricity supply shares under the firm impression that the investment would remain undisturbed until 1971 at the earliest. For them to be confronted with the likelihood of having their securities taken over by an electricity authority at a value which can hardly be assessed at present, is a most unpleasant prospect. The prices of shares would have fallen considerably more than they have done had it not been for the assumption that nothing will be put into definite practice until after the war.

Moderate Price Declines

Weakness in prices of Home electricity supply shares is nowhere pronounced. City Lights, County of London, London Electric, Metropolitan and Northmets show losses of from 9d. to 1s. 6d. Certain of the provincial companies' shares displayed sympathetic dullness. Yorkshires fell 1s. to 41s.; other declines were mostly confined to 6d. Llanelly Electrics at 26s. xd. are 1s. 6d. to the good, thanks to the kindly influence of the recent dividend advance. Scottish Power are a trifle easier at 41s., Clyde Valley hold their ground at 42s. Both companies pay dividends of 8 per cent., the same rate as Midland Counties, the price of which has gone back 1s. to 40s. 6d.

Overseas shares are mostly better where changes have occurred. Palestine Electrics put on a further 3s. being now 37s. 6d., upon confident anticipation of the dividend being raised; last year, it was 4 per cent. free of tax. East African Power are 1s. better at 32s. Calcutta Electrics have gained 6d. at 34s. 6d.

Communication Stocks

Cable & Wireless 5½ per cent. preference stock rose 1½ to 114½ on the statement that the combine has applied £6,000,000 to national war borrowing. This evidence of the company's continued financial strength served to direct investment notice to the preference stock and to emphasise its usefulness as a good mixing security giving a yield of £4 16s. on the money. The price of the ordinary stock is up 1 at 76. Other communication stocks are steady, Anglo-American Telegraph preferred tieing with Cable & Wireless preference at 114½; the dividend on the former is 6 per cent., and on the Cable stock 5½ per cent. Oriental Telephones are again 1s. lower in spite of the fact that the assets of the company work out at a figure which would seem to justify the shares standing at all events around 40s.

Increased Dividends

A rise of 3s. has lifted Lancashire Dynamo shares to 86s., this being due to the announcement of an increase in the dividend of 2½ per cent., making 22½ per cent. for the year, 15 per cent. being declared as dividend, and 7½ per cent. as bonus. The net profit is £11,000 up. Enfield Cable Works' profit figures are £51,000 less than those of the preceding year. The dividend is maintained at 12½ per cent. The price fell 1s. 6d. to 57s. 6d.

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ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price Mar. 16	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	61/3	..	4 1 7
British Power and Light	6	7	31/6xd	−6d.	4 9 0
City of London	7	7	31/-xd	−1/-	4 10 4
Clyde Valley	8	8	42/-	..	3 16 2
County of London	8	8	40/-xd	−1/6	4 0 0
Edmundson's:					
7% Pref.	7	7	34/-	..	4 2 4
Ord. .*	6	6	29/-	−6d.	4 2 9
Elec. Dis. Yorkshire	9	9	45/-	..	4 0 0
Elec. Fin. and Securities	12½	12½	51/-	..	4 18 1
Elec. Supply Corporation	10	10	47/-	..	4 5 0
Isle of Thanet	2	Nil	16/-	..	—
Lancs. Light and Power	7½	7½	37/-	−6d.	4 1 0
Llanelly Elec.	5½	6	26/-xd	+1/6	4 12 4
Lond. Assoc. Electric	4½	4	23/6	−6d.	3 8 1
London Electric	6	6	26/6	−1/-	4 10 7
London Power Red. Deb.	5	5	103½	..	4 16 7
Metropolitan E.S.	8	8	40/-xd	−1/6	4 0 0
Midland Counties	8	8	40/6	−1/-	3 19 0
Mid. Elec. Power	9	9	44/-	..	4 1 9
Newcastle Elec.	7	7	31/-xd	+8d.	4 10 5
North Eastern Elec. Ordinary	7	7	34/-	−6d.	4 2 4
7% Pref.	7	7	36/-	−6d.	3 17 8
Northampton	10	10	47/6	..	4 4 0
Notting Hill 6% Pref. (£10)	6	Nil	9¾	..	—
Northmet Power: Ordinary	7	7	37/-xd	−9d.	3 15 8
6% Pref.	6	6	31/6	−6d.	3 16 2
Richmond Elec.	6	6	27/-	..	4 9 0
Scottish Power	8	8	41/-	−6d.	3 18 1
Southern Areas	5	5	23/6	..	4 5 0
South London	7	7	26/-xd	..	5 7 8
West Devon	5	5	23/-	..	4 7 0
West Glos.	4½	5½	23/6	..	2 19 7
Yorkshire Elec.	8	8	41/-	−1/-	3 18 1
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	5/-	..	—
Calcutta Elec.	7*	7*	34/6	+6d.	—
Cawnpore Elec.	10	10	28/-	..	7 2 10
East African Power	7	7	32/-	+1/-	4 7 6
Jerusalem Elec.	7	5	24/6	..	4 1 8
Kalgoorlie (10/-)	7½	5	9/-	..	5 11 1
Madras Elec.	6*	4*	24/-	..	—
Montreal Power	1½	1½	27½	−1	5 9 3
Palestine Elec. "A"	Nil	4*	37/6	+3/-	2 2 7
Perak Hydro-elec.	6	7	9/6	..	—
Shawinigan Power	83cts.	90cts.	18	−1	—
Tokyo Elec. 6%	6	6	19	+½	—
Victoria Falls Power	15	15	78/9	..	3 16 4
Whitehall Inv. Pref.	5	5	23/-	..	—

Company	Dividend Previous	Dividend Last	Middle Price Mar. 16	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 Civil Defence)	—	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	108	..	4 3 4
1963–93	3½	3½	104½	..	3 7 0
1974–94	3½	3½	102	..	3 3 9
London Elec. Trans. Ltd.	2½	2½	96½	..	2 11 10
London & Home Counties 1955–75	4½	4½	110	..	4 1 10
Lond. Pass. Trans.:					
A	4½	4½	121½	..	3 14 0
B	5	5	120½	..	4 3 0
C	2½	3	54½	..	5 10 3
WestMidlands J.E.A. 1948–68	5	5	109	..	4 11 9
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	114½	+1	5 4 9
Def.	1½	1½	29	..	5 3 5
Anglo-Portuguese	8	8	24/-	..	6 13 4
Cable & Wireless:					
5½ Pref.	5½	5½	114½	+1½	4 16 1
Ord.	4	4	76	+1	5 5 3
Canadian Marconi $1	Nil	4cts.	6/6	..	2 8 9
Globe Tel. & Tel.:					
Ord.	8½*	5*	35/-	..	2 17 2
Pref.	6	6	28/6	..	4 4 3
Great NorthernTel.: (£10)	Nil	Nil	23½	..	—
Inter. Tel. &Tel.	Nil	Nil	8	..	—
Marconi-Marine	7½	7½	32/6	..	4 12 4
Oriental Tel. Ord.	16	10	37/-	+6d.	—
Telephone Props.	6	Nil	14/-	..	—
Tele. Rentals (5/-)	10	10	10/9	..	4 13 0
Traction and Transport					
Anglo Arg. Trans.:					
First Pref. (£5)	Nil	Nil	5/-	..	—
4% Inc.	Nil	Nil	13½	..	—
Brit. Elec. Traction:					
Def. Ord.	45	45	1105	..	4 1 6
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8	10	52/-	..	3 17 1
Brazil Traction	8½	$1	23½	−½	—
Calcutta Trams	8	5½	21/6	..	5 2 4
Cape Elec. Trams	5	6	25/-	+6d.	4 16 0
Lancs. Transport	10	10	43/3	..	4 12 4
Mexican Light:					
1st Bonds	5	5	100	+7½	5 0 0
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd.	5	5	74	−1	6 15 4
5% Pref.	5	5	116½	..	4 5 10
T. Tilling	10	10	53/9	..	3 14 5
West Riding	10	10	41/6xd	+⅛	4 16 7

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Mar. 16	Rise or Fall	Yield p.c.
Equipment and Manufacturing					
			£ s. d.		
Aron Elec. Ord.	7½	10	40/–	..	5 0 0
Assoc. Elec.:					
Ord.	10	10	50/6	..	3 19 0
Pref.	8	8	40/–	..	4 0 0
AutomaticTel.&Tel.	12½	12½	56/6	..	4 8 6
Babcock & Wilcox	11	11	50/6	..	4 7 2
British Aluminium	10	10	49/3	..	4 1 4
British Insul. Ord.	20	20	5½	..	3 18 3
British Thermostat (5/–)	18½	18½	17/6	..	5 5 9
British Vac. Cleaner (5/–)	10	15	23/9	+1/8	3 3 2
Brush Ord. (5/–)	Nil	6	7/9	..	3 17 5
Burco (6/–) ..	15	15	13/9	..	5 9 1
Callender's ..	15	15	4 1/8	..	3 14 0
ChlorideElec.Storage	15	15	76/3	..	3 18 9
Cole, E. K. (5/-)	7	10	21/3	..	2 7 0
Consolidated Signal	17	24	5½	..	4 11 7
Cossor, A. C. (5/-)	15	10*	18/–	+1/8	5 11 1
Crabtree (10/–) ..	17½	17½	38/6	..	4 11 0
Crompton Parkinson Ord. (5/–) ..	30	20	26/–	..	3 17 0
E.M.I. (10/–) ..	6	6	21/6	+6d.	2 15 9
Elec. Construction	10	10	42/6	..	4 14 1
Enfield Cable Ord.	12½	12½	57/6	–1/6	4 7 0
Elecl. Switchgear (10/–)	10	10	20/–	..	5 0 0
English Electric ..	10	10	47/6	..	4 4 0
Ensign Lamps(5/–)	25	25	18/9	..	6 13 4
Ericsson Tel.(5/–)	22†	20†	47/6	..	2 2 2
Ever Ready (5/–)	40	40	38/6	..	5 4 0
Falk Stadelmann	7½	7½	29/–	..	5 3 5
Ferranti Pref. ..	7	7	28/9	..	4 17 5
G.E.C.: Pref. ..	6½	6½	34/3	..	3 16 0
,, Ord. ..	20	17½	89/–	..	3 18 8
Greenwood & Batley	15	15	36/6	..	8 4 4
HallTelephone(10/–)	10	12½	25/3	..	4 19 0
Henley's (5/–) ..	20	20	25/6	+6d.	3 18 6
4½% Pref. ..	4½	4½	23/–	..	3 18 3
Hopkinsons ..	15	15	57/6	–6d.	5 4 5
India Rubber Pref.	5½	5½	20/–	..	5 10 0
Intl. Combustion	30	30	6½xd	..	4 16 0
Johnson & Phillips	15	15	68/–	+6d.	4 8 3
Lancashire Dynamo	20	22½	86/–	+3/–	5 4 8
Laurence,Scott(5/–)	15	12½	10/–	..	6 5 0
London Elec. Wire	7½	7½	30/–	..	5 0 0
Mather & Platt ..	10	10	49/3	+6d.	4 1 2
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	5 1/8	–1/8	3 17 0
Pye Deferred (5/–)	25	25	21/3	..	5 17 8
Revo (10/–) ..	20	17½	35/–	–6d.	5 0 0
Reyrolle	12½	12½	65/–	..	3 17 0
Siemens Ord. ..	7½	7½	30/6	..	4 18 4
Strand Elec. (5/–)	4	7½	7/3	..	5 3 5
Switchgear & Cowans (5/–) ..	10	20	15/–	+1/6	6 13 4
T.C.C. (10/–) ..	5	5	15/–	..	3 6 8
T.C. & M.. ..	10	10	47/–	..	4 5 1
Telephone Mfg.(5/–)	9	9	11/6	..	3 18 3
Thorn Elec. (5/–)	20	20	19/3	..	5 4 0
Tube Investments	23½	20	93/–	..	4 6 0
Vactric (5/–) ..	Nil	Nil	12/9	–3d.	—
Vickers (10/–) ..	10	10	19/6	–3d.	5 2 7
Ward & Goldstone (5/–)	20	20	22/–	..	4 11 0
Westinghouse Brake	10	12½	63/6	..	3 18 9
WalsallConduits(4/–)	55	55	44/–	+1/–	5 0 0
West, Allen (5/–)	7½	7½	7/–	..	5 7 2

* 5 per cent. tax-free. † Dividends free of Income Tax.

Stocks and Shares (*Continued from page* 400)

British Insulated has declared the regular dividend, making 20 per cent. for the year. Switchgear & Cowans has doubled its previous dividend of 10 per cent. This is better than had been expected, and the price hardened to 15s., with little or no supply of shares available in the market. British Vacuum Cleaner 5s. shares at 23s. 9d. are 1/8 better; the last increase of 5 per cent. in the dividend continues to bring in buyers.

Miscellaneous Matters

Henley's with a rise of 25s. 6d. give a yield of £3 18s. 6d. per cent., similar to that offered by British Insulated at 5½, while Callender's at 81s. 3d. return £3 14s. per cent. Johnson & Phillips strengthened to 68s., Walsall Conduits to 44s., and Mather & Platt to 49s. 3d. For a day or two, there was a disposition to depress prices in the electrical industrial group as a corollary to the fall in the market for supply shares. The lack of any logical reason for such a movement was too quickly recognised for the decline to make any progress.

Cape Electric Trams are a little better at 25s., and the company has raised its dividend by 1 per cent. to 6 per cent. Victoria Falls are unchanged at 78s. 9d. The dollar division keeps its prices. Brazilian Tractions are an active market on the basis of 23¾. A rise of 2½ points in Mexican Light & Power firsts has brought the price to 100.

A. C. Cossor Limited

One of the most active parts of the Miscellaneous Market during the past week or so has been that for A. C. Cossor ordinary shares. These have come up from a few shillings to the present price of 18s., which is the highest rate for years past. The capital of the company is £1,000,000 divided equally into 6 per cent. preference shares of £1 each and two million ordinary shares of 5s. each. Dividends are paid in March and September. It is said that the company has made remarkable progress in the year which ends with the current month and that when the figures appear, they will provide extremely pleasant reading for the shareholders. No little curiosity is felt as to how the expectation of increased dividend and bumper earnings will be resolved by the next report. For the year ended March 31st, 1942, the interim dividend was 5 per cent., with a final, also of 5 per cent., the latter being free of tax.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Banbridge.—March 23rd. Civil Defence Group Committee. Installation of electric wiring and lighting at public decontamination unit. Forms of tender from T. T. Houston, architect, Kingscourt, Wellington Place, Belfast; tenders to K. M. Shooter, secretary, Civil Defence Office, Banbridge.

Belfast.—March 23rd. Town Council. Trolley-bus batteries. Forms of tender from the acting general manager, Transport Department, Sandy Row; tenders to J. F. C. M'Kinstry, acting town clerk.

Kilmarnock.—March 24th. Town Council. One year's supply of electric lamps for all the Corporation departments and for street lighting. Particulars and forms from the Burgh Surveyor's Office, 7, Green Street; tenders to the town clerk.

Plymouth.—March 20th. Electricity Supply Department. One suspension electro-magnet and auxiliary apparatus and two three-phase inter-star neutral earthing compensators (March 5th).

West Riding.—March 24th. Public Assistance Committee. Electrical work in connection with extensions to the maternity department at the County Hospital, Keighley. Specifications from the architect, County Hall, Wakefield; tenders to B. Kenyon, deputy clerk.

Orders Placed

Cardiff.—Electricity Committee. Accepted. Three 1,000-kVA transformers (£2,040).—Bryce, Ltd. Cable for twelve months.—Aberdare Cables.

Lancashire.—Public Assistance Committee. Accepted. Electric lighting in indoor shelters at Lancaster Institution.—W. A. Inman.

Lichfield. — Estates Committee. Accepted. Electrical installation at fire headquarters (£119).—Ford & Rowley.

London.—Metropolitan Water Board. Accepted. Two electrically driven pumps (£1,016).—Paterson, Simons & Co.

POPLAR.—Electricity Committee. Accepted. Air-heater replacements (£5,088).—International Combustion Co.

Middlesbrough. — Education Committee. Accepted. Installation of electric lighting in three wartime nurseries (£51).—Graham Bros.

Swindon.—Electricity Committee. Accepted. Foundation works, Moredon power station (£1,500).—Higgs & Hill. Dismantling and re-erection of turbine set, etc. (£5,000).—Brush Electrical Engineering Co. Cable.—Standard Telephones & Cables.

Warrington. — Cleansing Committee. Accepted. Batteries for electric vehicles.—Chloride Electrical Storage Co. Refuse collection vehicle.—Baldwins.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Alderley Edge.—Conversion of old Council Offices into Public Library; C. Watkins, surveyor, Council Offices, Alderley Edge, Cheshire.

Backworth.—Canteen at Fenwick's Pit; T. A. Page, Son & Bradbury, 75, King Street, South Shields.

Berkhamsted.—British Restaurant for U.D.C.; A. E. J. Baker, deputy clerk, Civic Centre.

Birmingham.—Restaurants (£49,000); and shelters (£728,254); city engineer.

Bradford.—Houses, Clayton, Eccleshill, Buttershaw and Idle; J. T. Castle, city architect, Town Hall.

Carlisle.—British Restaurant, Shaddongate; city engineer, 18, Fisher Street.

Cheltenham.—Ten public shelters (50 persons each); G. Gould Marsland, borough engineer, Municipal Offices.

Cocken.—Miners' canteen; A. H. Fennell, Bridge End Chambers, Chester-le-Street.

Coventry.—Completion of 58 unfininished houses on Charter housing estate (£306 per house); D. E. E. Gibson, city architect, 1a, Warwick Row.

Croydon.—Senior school, New Addington (£70,000); E. Taberner, town clerk.

Doncaster.—Omnibus station at Marsh Gate; E. H. Ford, estates surveyor, 3, Priory Place, Doncaster.

Houses (22) for Isle of Axholme R.D.C.; J. T. Battye, surveyor, Council Offices, Epworth, Doncaster.

Eccles.—British Restaurant and cooking depot, Winton (£2,065); W. Higson & Sons, builders, Douglas Road, Worsley, near Manchester.

Ferryhill (Co. Durham).—Canteen at the Dean and Chapter Colliery; G. W. Lazenby & Sons.

Gateshead. — Further wartime nurseries; borough engineer.

Outpatients' department at the Bensham Hospital; F. H. Patterson, borough engineer.

Works canteen at the North Eastern Trading Estate; H. Pitt, Ltd., Leopold Street, Millfield, Sunderland.

Hendon.—Additional accommodation at York Park Nursery (£1,121); borough engineer, Town Hall, N.W.4.

Hexham.—Farm workers' houses (18) for the R.D.C.; surveyor.

Lancashire.—Annexe for school canteen kitchen at St. Dominic's R.C. School, Huyton; S. & A. Taylor, Ltd., builders, Ackers Street, Prescot, near Liverpool.

London.—Depot extensions and A.R.P. works (£59,000) ; L.C.C. architect.

Manchester.—Laboratory at works ; Fram Reinforced Concrete Co., Ltd., building contractors, 165, Plymouth Grove.

Matlock.—Houses (44), Cromford Hill Estate; J. Turner, surveyor, Town Hall.

Newcastle-on-Tyne.—Wardens' posts at Jesmond; W. W. Kelsey, Hanover Square.

Newton-le-Willows. — Wartime day nursery, Patterson Street, Earlestown; J. Walmsley, U.D.C. surveyor, Highways Maintenance Department, Town Hall, Earlestown, Lancs.

North Riding.—A.R.P. depot at Grangetown (£784); county architect, Northallerton.

Rothwell, Yorks. — Houses at Methley for U.D.C. ; F. Hartley, surveyor, Council Offices, Rothwell, near Leeds.

Sacriston Colliery (Durham).—Canteen; G. Henderson, Boldon Lane, East Boldon.

Salford.—Rebuilding offices, Broughton Bridge Paper Mills; Olive & Partington, Ltd., Lower Broughton.

Stockport.—Canteen; Stockport Industrial & Equitable Co-operative Society, Chestergate, Stockport.

Surrey.—Physics laboratory at Reigate Grammar School (£1,616 with equipment) ; county architect, County Hall, Kingston-on-Thames.

Central kitchen, Hillcross School Merton, Merton (£2,642); Surrey county architect.

Thatcham.—Cooking depot (£2,385), for Berkshire C.C.; F. J. Reynolds & Son, builders, Thatcham.

Vane Tempest Colliery (Durham).—Miners' canteen; D. & J. Ranken, Ltd., Stockton Road, Sunderland.

Wallsend-on-Tyne. — Canteen ; R. Hood, Haggie & Sons, Ltd.

Whaley Bridge.—Cold store for bottled milk, Whaley Bridge and Buxton Co-operative Society, Ltd.

Wigan.—Building and concentrator plant at Cleansing Depot (£3,500); L. Lyons, borough surveyor, Municipal Buildings.

Wooley (Durham).—Miners' canteen ; G. Gradon & Sons, North Road, Durham City.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

AKT.-GES. für Technische Studien.—"Method for the regulation of the output of thermal power plants and arrangements for carrying out this method." 13853/42. October 4th, 1941. (551456.)

Babcock & Wilcox, Ltd., and R. E. Zoller.—"Boilers." 10709. August 22nd, 1941. (551483.)

Best Products, Ltd., and F. L. Best.—"Electric immersion heaters." 10758. August 22nd, 1941. (Addition to 528682). (551558.)

F. J. G. Van den Bosch and Vacuum-Science Products, Ltd.—"Electron multipliers." 9340. July 23rd, 1941. (551498.)

British Thomson-Houston Co., Ltd.—"Electric transformers." 11492/41. September 10th, 1940. (551509.) "Electric lampholders." 11885/41. September 18th, 1940. (551538.) "Phase shifting electric circuits." 13282/41. October 17th, 1940. (551562.) "Control of electric motors through grid-controlled rectifiers." 13910/41. October 31st, 1940. (551564.)

British Thomson-Houston Co., Ltd. (Tokyo Shibaura Denki Kabushiki Kaisha).—"Gaseous electric-discharge lamps." 7180. June 6th, 1941. (551462.)

British Thomson-Houston Co., Ltd., and G. T. Grapes.—"Circuit arrangements for operating electric-discharge lamps." 10736. August 22nd, 1941. (551487.)

Cinch Manufacturing Corporation.—"Electric wiring terminals." 15108/41. December 6th, 1940. (551565.)

J. W. Dalgleish and Pye, Ltd.—"Modulated high-frequency carrier-wave signalling systems." 10621. August 20th, 1941. (551472.)

English Electric Co., Ltd., J. P. Chittenden, and R. J. Welsh.—"Governing of a prime mover such as a turbine supplied by gas generators." 13874. October 28th, 1941. (551516.)

Londex, Ltd., W. S. F. Brown and W. Stern.—"Means for detecting, indicating or signalling conditions prevailing in an electric circuit." 306. January 8th, 1942. (551544.)

London Electric Wire Co. & Smiths, Ltd., and E. L. Wildy.—"Coating of wires and the like with liquid composition." 11471. September 8th, 1941. (551535.)

P. R. Mallory & Co., Inc.—"Variable resistance devices." 16243/41. December 4th, 1940. (551572.)

Marconi's Wireless Telegraph Co., Ltd.—"Sweep circuit generation for cathode-ray tubes." 12463/41. September 26th, 1940. (551539.)

C.A. Payne.—"Water cooling towers and similar apparatus." 16296. December 17th, 1941. (551574.)

L. Satchwell.—"Electric resistance grids." 7489. June 2nd, 1942. (551452.)

J. W. Smith.—"Depolarising materials." 10593. August 20th, 1941. (551471.)

Standard Telephones & Cables, Ltd. (W. J. Polydoroff).—"Aerials for wireless communication." 5270. March 21st, 1940. (Addition to 522492). (551546.)

Standard Telephones & Cables, Ltd., D. Bannock and T. S. Frooms.—"Clutches." 10732. August 22nd, 1941. (551486.)

Standard Telephones & Cables, Ltd., H. Wolfson and S. C. Shepard.—"Thermistors." 10730. August 22nd, 1941. (551485.)

Westinghouse Brake & Signal Co., Ltd., A. H. B. Walker and T. F. E. Watson.—"Protection of electrical apparatus from high-voltage surges and the like." 10516. August 19th, 1941. (551443.)

Westinghouse Electrical International Co.—"Insulated electrical conductors." 13153/41. October 16th, 1940. (551450.)